OUR INLAND SEAS
Their SHIPPING and COMMERCE for THREE CENTURIES

By JAMES C. MILLS

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EXPLANATION

Following the successful reprinting of HISTORY OF THE GREAT LAKES (2 volumes) in 1972, FRESHWATER PRESS, INC. is pleased to offer this reprinting of another historical masterpiece—OUR INLAND SEAS.

This book is an *exact* reprint of the original 1910 edition, published by A. C. McClurg & Company of Chicago, Illinois. Long out of print, this volume has become a "Collector's Item" and has been highly priced in Rare Book Stores. Now our readers can have OUR INLAND SEAS for their own and we hope that the book's great historical and pictorial content, which covers three centuries of the Great Lakes historical scene, will be most rewarding to the buyers of this book.

OUR INLAND SEAS is meant to be a smaller sequel to the HISTORY OF THE GREAT LAKES, amplifying on the shipping side of Great Lakes history. It takes the reader from Duluth and Chicago on the west to the Atlantic Ocean on the east in covering the Great Lakes scene. We are sure that you will enjoy it!

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OUR INLAND SEAS

Le Griffon, first sailing vessel on Great Lakes, built by La Salle, 1679

(From an old cut in Detroit Public Library)

OUR INLAND SEAS

THEIR SHIPPING & COMMERCE FOR THREE CENTURIES

BY

JAMES COOKE MILLS

WITH ILLUSTRATIONS FROM PHOTOGRAPHS AND MAPS AND DRAWINGS

CHICAGO
A. C. McCLURG & CO.
1910

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TO
THE STURDY MARINERS OF THE FRESH-
WATER SEAS WHO, IN FAIR
WEATHER AND FOUL, ARE
EVER ON THEIR
POST OF DUTY

PREFACE

FROM time immemorial, through all stages of the world's history, the natural waterways of the earth have been the well-chosen routes of travel by all races of men. Over the vast expanse of the high seas and through the limited confines of inland waters, the commerce of nations has moved and has increased in volume with the passing centuries. In the pioneer days of America, the rich land of vegetation and underground treasure, the lakes and streams were the positive guides set by the Creator of the Universe for the stranger in the wilderness. Into the very depths of the pathless forest the early explorers pushed their way in the crude but buoyant craft of the natives, which were paddled or poled against the swift current. Even before the settlements which followed along the shores of the lakes had increased in number and grown to trading-posts of some importance, the hardy forerunners of empire were eager for new adventures and new lands to conquer. By following the natural watercourses they plunged still further into the interior of the dense forest; and thus in time, new hamlets sprang up along the navigable streams.

When the land began to show its increase and Indian trade was fostered, the lakes and rivers were the natural highways of communication with the outside world, and upon their waters were carried the rich products of the wilds. On the return trips the light, bobbling canoes brought the goods and trinkets of civilization for barter with the natives. With increasing trade there appeared larger and beamier boats, much more stable, to take the place of the Indian canoe; and in time the small sailing craft became the economic mode of conveyance.

Finally the steamboat appeared and, with all its fussing and fuming and boiler explosions, was soon the popular means of travel. There was some degree of certainty in its movements, as it was less dependent upon wind and wave.

When the tide of immigration set in about eighty years ago, there followed a rapid development of the material resources of the new land; and the expanse of the lakes and the connecting water highways became arteries of an extensive commerce. Shipbuilding was greatly stimulated, and the steam tonnage was of such size and the cabin accommodations for the comfort and pleasure of passengers so well provided, that travel on the lakes was no longer regarded as a hardship to be avoided if other means were at hand. The increased size of the steamboats and the march of progress toward the West brought about demands for deeper channels, which were met by digging out the navigable streams and the canalization of narrow and shallow rivers. The principal ports on the lakes were made safe harbors of refuge, lighthouses and other beacons were established to mark dangerous reefs and narrow channels; and, in more recent years, the life-saving service and the lake survey have been added as further safeguards to life and treasure.

As years passed, excursions on the lakes became popular and of daily occurrence from the larger ports during the summer months, and tourist travel throughout the fresh-water seas was inaugurated. There has been, and is still, a mighty wave of expansion, impelled by a spirit of optimism, sweeping over the Great Lakes region; commerce continues to grow apace; and, despite the extension of railroads paralleling every marine highway, with a diversion of a portion of the lake traffic to the rail routes, the water-borne commerce has increased in volume and the vessel interests have prospered.

The main object of improving the waterways of America, and thus adding to transportation facilities, is an eco-

nomic one. Man in search of fortune always seeks the easiest modes of travel, along the lines of least resistance, and those offering the minimum expenditure of human energy. It may sooner bring about the object of his life. That which affects a saving to him in cost of freights is surely an economic measure for the conservation of the resources of the land and adds to the wealth of the nation. To show the development of the Great Lakes marine, from the Indian canoe to the great modern leviathans, and the intimate relation it bears to the prosperity of the whole country and the contentment of millions of people, is the purpose of the story contained in the following pages.

J. C. M.

Saginaw, Mich.
July, 1910

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OUR INLAND SEAS

THEIR SHIPPING AND COMMERCE FOR THREE CENTURIES

CHAPTER I

THE ORIGIN, DISCOVERY, AND MAGNITUDE OF THE GREAT LAKES

Geological Formations — The Glaciers — Lake Iroquois — Discoverers of the Lakes — Lake Erie Last of All — Reasons for This — Early Maps of the Region — Geographic Locations of the Fresh-Water Seas — Drainage Basin — Volume of Lakes — Superimposed on Eastern States — Waters of Lake Superior — Levels and Area.

THE last touch in the completion of the North American continent was the creation of the Great Lakes, and they constitute its greatest physical feature. Of the ancient geologic conditions it is believed that, "in very olden times the lake district formed a great plateau at a considerable altitude above the sea, with some bordering mountains and high lands. It was high enough to permit the excavation of deep valleys, many of which have long since been filled up with sand and drift, and now lie beneath the lake waters. The sea was then farther distant from the present lake region than now."

The entire north country is full of stirring evidences of Nature's handiwork, and the geological history of a vast and rich territory has been plainly written for all generations. By certain and definite indications it has been determined that the whole lake region was formed thousands of years ago by a series of great glaciers, grinding and crunching their way, ever so slowly, from beyond

the Arctic Circle. What was going on during a prehistoric period has had very much to do with the development of Middle America, and what is going on there to-day. The huge masses of ice, with their moraines loaded down with huge bowlders and soil from the distant north, gouged out deep valleys, the largest of which now form the beds of the Great Lakes.

By the slow process of melting in the changing climate from frigid to temperate, the glaciers eventually disappeared, and the waters spread over these valleys, entirely filling them. The numerous lakes thus created finally overflowed, and their waters uniting formed a vast inland sea, which has been named Lake Iroquois. This was something like thirty-five thousand years ago, when the great body of water spread over the whole lake region. The southern shore cliffs and beaches can be traced to-day at many places along an inland ridge running east and west through Ohio and Indiana, while in New York State the tracings extend as far east as Rome.

The Niagara escarpment, which formed a portion of the southern shore of Lake Iroquois for about one hundred miles, is the most prominent demarcation of the glaciers in that section. It mutely testifies to the overwhelming forces of Nature which wrought such changes in the crust of the continent. The surface of Lake Iroquois was from three hundred to five hundred feet above the present level of Lake Ontario, and was impounded by a gigantic ice jam at some point down the St. Lawrence. The main outlet of the lake during this formative period was the great river flowing southward to the Gulf of Mexico, but as the northwest country gradually tilted, the water naturally overflowed to the east. This caused the eastern end to seek the outlet to the Atlantic across the country which is now the State of New York. There are plain evidences along the Mohawk River to prove that that stream was the main channel of the Iroquois outlet. It is more than probable that the waters mingled with the

ocean through the waterway civilization has named the Hudson River.

Lake Iroquois was drained off some seventeen thousand years ago, at which time the beach between the Niagara escarpment and the present shore of Lake Ontario was formed. It is from two to seven miles wide, and is a rich tract of farming country, protected in a degree from the high winds by the elevated plateau at its back, and tempered by the waters of the lake.

The Great Lakes of America, which in every sense may properly be termed "Inland Seas," were not discovered by Europeans during any one voyage of conquest; and the first knowledge of the existence of any large bodies of water on the continent came fully one hundred years after the discovery of the great river, the "Mesippi." It was in 1615 that Champlain, one of the earliest and most renowned navigators of New France, with the Recollet friar, Le Caron, made the discovery of Lac Huron; and the first mission established in the northwest country was located on the eastern shores of Georgian Bay. The following year Champlain announced the existence of another great lake at the head of the St. Lawrence, the waters of which found an easy outlet in the swift current and the rapids of the broad stream. This was named Lac Ontario. The lake at the farthest north was discovered in 1629 by Etienne Brule and, because of its vast area, determined by exploration to be much greater than the others, was named Lac Superior. Five years later, in 1634, Lac Mitchiganing des Illinois was explored by Jean Nicollet, who added the long stretch of troubled waters to the group of fresh-water lakes. In 1669, more than fifty years after the discovery of Lac des Huron, the existence of a fifth large lake was made known, probably by Joliet, and named Lac Teiocharontiong des Erie. The existence of connecting straits between these bodies of water at the time was a mere conjecture.

From the positions of the lakes it is somewhat remark-

able that the most southerly one of the group, extending to the east beyond the western end of Lake Ontario, should have been the last of the five to come under the dominion of white men. But the reason is obvious when it is considered that Lake Erie — the unknown — lay in the recesses of a hostile country guarded by the warlike Iroquois, or the Five Nations. On account of the treacherous and unyielding character of these savages, which were the veritable tigers of the American Indian, and partly because of the greater distance of a southern route, the course of the French missionaries and the pioneer fur traders from Montreal was up the Ottawa River; and, by following a certain tributary the voyagers by a short portage reached a secluded lake. From there it was a short journey down a quiet stream to Georgian Bay and the mission established by Le Caron. This route to the upper lakes was followed by the Hurons, with whom the French were on the most friendly terms.

The first attempts to map out the Great Lakes in intelligible form were made by Champlain in 1632, and some years later by Galinée, but their knowledge of the vast territory drained by the chain of lakes was so meagre that the most crude and inaccurate diagrams were the result. In these early maps the peninsula of Michigan was not shown, and the waters of Lake Huron appeared to extend in a broad expanse to the westward and merged with those of a large bay, which two years later was found to be another great lake, extending many leagues to the south. Lake Erie was not shown, for it was then unknown to the French. In 1671 the map appearing in the Jesuit Relations indicated that the friars had explored every part of the great fresh-water ocean — Lake Superior — and that they had full knowledge of the straits connecting the three upper lakes, and of the adjacent bays, inlets, and shores.

About two years after, a map having no title nor bearing the name of its author was printed in France, and it

indicated a greatly increased knowledge of the country. The outlines of the shores of the lakes, their bays and rivers, and the general directions and proportions were set down with a degree of correctness which is remarkable, the peninsula of Michigan being shown in very nearly its true form. The map is more than four feet long by two and a half feet wide, and is supposed to have been the work of La Salle, as the most easterly lake is given as "Lac Ontario ou des Frontenac," in honor of his patron, the governor-general of Canada. The fort at Cataraqui and the Iroquois villages on the north shore are indicated, as well as the Niagara River and falls. On Lake Michigan, opposite the site of Chicago, is written (translation), "The largest vessels can come to this place from the outlet of Lake Erie, where it discharges into Lac Frontenac; and from this marsh into which they can enter, there is only a distance of a thousand paces to the River la Divine [Des Plaines] which can lead them to the river Colbert, [Mississippi] and thence to the Gulf of Mexico." The whole length of the Ohio is laid down, and is so spelled, as it was so called by the roving bands of Indians on account of the beautiful scenes along its banks.

Other maps by Marquette and Joliet are but rude sketches of portions of the upper lakes and connecting streams, although a later one by Joliet, intended for Colbert, the Minister of Marine, is an elaborate piece of work but quite inaccurate. In this map an open sea is made to extend from Hudson's Strait westward to the Pacific. The Great Lakes and the St. Lawrence River are laid down with few errors, as is also the Gulf of Mexico. The Mississippi is called plainly the "Messasipi."

In mere point of magnitude, and of the great areas of the region drained by their tributary streams, the Inland Seas may well be characterized as the most important physical feature of the American continent. And when it is considered that the broad chain of lakes and their

connecting straits have been so large a factor in the development of a vast territory much greater than their drainage basin, and have exerted so large an influence on the climate of the Northern States and of Canada, their immense value to millions of the human race is at once evident. Situated between 75° and 92° west longitude, and between 41° and 50° north latitude, the Great Lakes include a region one thousand miles in length, east and west, and five hundred miles in breadth, north and south, which represents a drainage basin of more than two hundred and seventy thousand square miles. This is divided among the different bodies of water as follows:

AREA IN SQUARE MILES

	Water Surface	*Watershed*
Lake Superior	31,200	51,600
St. Mary's River	150	800
Lake Michigan	22,450	37,700
Lake Huron and Georgian Bay	23,800	31,700
St. Clair River	25	3,800
Lake St. Clair	410	3,400
Detroit River	25	1,200
Lake Erie	9,960	22,700
Niagara River	15	300
Lake Ontario	7,240	21,600
Total area of drainage basin		270,075

Lake Superior, which is the largest body of fresh water on the globe, discharges at its outlet, the St. Mary's River, eighty-six thousand cubic feet of water per second, which, upon merging with the waters of Lake Michigan and Lake Huron and Georgian Bay, is increased to two hundred and twenty-five thousand cubic feet per second at St. Clair River. As this immense volume continues through Lake Erie the watershed of that lake further increases it to two hundred and sixty-five thousand cubic feet at Niagara; and it is again swelled to three hundred thousand cubic feet as the St. Lawrence River takes up the flood and rushes it onward to the Atlantic. More than

two hundred streams pour their icy waters into Lake Superior, and eight hundred into the other lakes, which amounts to six thousand cubic miles, sufficient of itself to supply Niagara for one hundred years. The water surface of the lakes, bays, and rivers represents an area more than half that of all the fresh water on the globe.

Figures and statistics at best are but cold evidences of fact, and seldom convey to the mind true proportions or accurate comparisons. To more clearly illustrate the magnitude of the Great Lakes, they have been superimposed on the Eastern States, by John Birkenbine, the well-known engineer, with quite a surprising result.

"We are familiar with the expression 'Great Lakes,' but do not appreciate their magnitude. If Lake Superior be superimposed on Pennsylvania and adjoining States, its eastern extremity, White Fish Bay, can be placed at Sandy Hook, N. J., and Duluth at its western end would be beyond Wheeling, W. Va., the greatest width of the lake corresponding closely with the north and south boundaries of Pennsylvania. If Lake Michigan be so placed that Philadelphia occupies the same relative position as Chicago, the northern end would extend to Montpelier, Vt., its width being practically the distance between Philadelphia and New York. Treating Lake Huron in a similar manner and placing its southern extremity at Philadelphia, it would extend in a northerly direction beyond Albany, N. Y., the foot of Georgian Bay corresponding with New Haven, Conn., that of Saginaw Bay being at Pottsville, Penn., while the Straits of Mackinac would approach Rochester, N. Y., the distance from the foot of the lake to the straits being practically that between Philadelphia and Pittsburg. Assuming Philadelphia as occupying the same position on the shore of Lake Erie as Buffalo, Pittsburg would correspond with the mouth of Detroit River, and the distance across Lake Ontario from Watertown, N. Y., on the east to Hamil-

ton, Ontario, on the west is equal to that from Philadelphia to Cumberland, Md."

The waters of Lake Superior are marvellously clear, and even in midsummer are exceedingly cold, never reaching a higher temperature than 40 Fahrenheit. "In passing along its rocky shores in my frail canoe," observes Mr. Lanman, "I have often been alarmed at the sight of a sunken bowlder, which I fancied must be near the surface, and on further investigation have found myself to be upwards of twenty feet from the danger of a concussion; and I have frequently lowered a white cloth to a depth of one hundred feet or more, and been able to discern its every fold and stain. The color of the water near the shore is a deep green, but off soundings it has all the dark blue appearance of the ocean. The sandy shores are more abrupt than any body of water I have ever seen; and within a few feet of many of its innumerable bluffs, it would be impossible for a ship to anchor."

The level of the Inland Ocean is six hundred and two feet above the sea, and its turbulent waters reach great depths. Near the middle of its broad expanse over which a fast modern steamer may plough its way for thirty hours without the traveller having a sight of land, the depth is upward of thirteen hundred feet; and much of its bed lies seven hundred feet below the surface of the salt-water oceans. The shores of the lake are largely rock-bound, and in some places, notably near Grand Island on the south shore, the crags are carved out by water erosion in curious and fantastic forms, with a cavernous opening into a high vaulted chamber, into which vessels of moderate size can enter. This wild and rocky shore, abounding in beautiful scenery, bears the appropriate name, "Pictured Rocks." The largest island is Isle Royal, lying within the United States boundary, while Michipicoten, Isle of Ignace, and groups of smaller islands near the north shore lie wholly in Canadian waters. At the head of St. Mary's

A Map of the country of the Five Nations, belonging to the Province of New York, and of the lakes near which the nations of far Indians live, with part of Canada

(Reproduction of a map accompanying Colden's "History of the Five Nations," London, 1747)

Scene in the Thousand Islands

River the waters of Lake Superior fall nineteen feet over rapids nearly a mile long, and flow for fifty miles through numerous channels into Lake Huron.

Lake Michigan, which is the only one of the Great Lakes lying wholly within the limits of the United States, is three hundred and fifty miles in length, and its average width is about seventy miles. Its surface is five hundred and eighty-one feet above the sea, and its greatest depth is eight hundred and sixty-eight feet, with its bed more than two hundred feet below the sea level. The waters flow northward through the Straits of Mackinac, merging with those of the other two upper lakes. Lake Huron and Georgian Bay have a common level with Lake Michigan, and the depth of the lakes is nearly the same. The shores of these lakes are mostly sandy bluffs, the land rising gradually in natural terraces to higher ridges far inland. Lake Huron has a total length of two hundred and twenty-five miles, and at its widest point south of Thunder Bay is more than one hundred miles in width. An extended expanse from the head of Saginaw Bay across the bay and lake and through Georgian Bay to the mouth of French River is approximately as long as the greatest length of the lake itself. Furious nor'easters sweep over the lake, and mariners dread the crossing of Saginaw Bay during the last months of the navigation season.

The strait through which the combined waters flow, composed as it is of two great highways of commerce and an extension of one into a small and shallow lake called St. Clair, is ninety miles long, and from one-half mile to a mile in width, and has a broad outlet into Lake Erie. This historic lake, which is so bountifully supplied with islands of various sizes and shapes, upon which Nature has lavished her richest gifts, is two hundred and sixty miles in length, and from fifty to sixty miles in width. Its surface is five hundred and seventy-three feet above the sea level, but its greatest depth is only two hun-

dred and ten feet, so that its bed lies almost four hundred feet above the sea. Compared with the depth of the other lakes, Lake Erie is but a broad shallow scoop in the earth's crust. Because of its shallowness so'westers are prevalent in this region, and nor'easters often lash its troubled waters into rough choppy seas of a severity provoked by all the Titanic furies. With its long record of shipwreck and death, surpassed by none of the larger upper lakes, Lake Erie is appropriately termed "the marine graveyard of the inland seas."

Into the Niagara River the flood of waters rushes as if eager to escape and, having dashed along the rocky bed of the upper rapids and hurled itself over the precipice only to be caught up in the swirl of other rapids, it finally reaches, in its descent of thirty-six miles, a new level three hundred and twenty-six feet below Lake Erie. Through the length of Lake Ontario, which is a distance of one hundred and eighty-five miles, its flow continues until the St. Lawrence River takes it up and rushes it along to meet the salt waters.

CHAPTER II

EARLIEST NAVIGATION

THE RACES OF INDIANS AND TRIBES IN THE LAKE REGION — THEIR CHARACTER AND TEMPERAMENT — DUGOUTS OR "PIROGUES" — BIRCH-BARK CANOES — USED BY EXPLORERS AND FUR TRADERS — HARDSHIPS AND PLEASURES OF EARLY MARINERS — THE BATEAU — MACKINAC BOAT.

SOMEWHERE back in the remote realm of Indian tradition and long before the advent of the "pale faces" upon the soil of America, the birch-bark canoe, so skilfully made and deftly handled by the aborigines, had its beginning — its baptism in the clear blue waters of the Inland Seas. For centuries before the Franciscans had established the missions of Ste. Marie and St. Ignatius upon the straits connecting the three upper lakes, and until after the pioneer fur traders had pushed their way beyond Michilimackinac to Green Bay, the native canoe was the only mode of conveyance on the lakes and rivers. It well served the purpose of its creation; it was light and buoyant; and, in coursing through the streams or timidly hugging the shores of the lakes, the savages, in bands of six or eight, found the frail craft the easiest means of travel.

The native races of America received their name "Indian" from Columbus who, upon coming to land after a long and wearisome voyage, believed that he had reached the far-famed Cathay, or the East Indies, hence the natural designation. The famous discoverer did not live to correct his error; and it is singular that so inappropriate a name should have clung to them through the centuries even unto the time of their gradual assimilation with civilization. The tribes inhabiting the Great

Lakes country at the time of the early French explorations, two hundred and fifty years ago, were included in two great races. The Algonquins, or that portion of them toward the west, occupied the region between Lake Huron and Lake Michigan and that west of the latter lake as far as the Mississippi, and north to Lake Superior. Their tribes embraced the Ottawas, Chippewas, Menomonies, Sacs and Foxes, Miamis, Potawatomies, Illinois, and Kickapoos. To the south and east of lakes Erie and Ontario, and as far as the Ohio River, the warlike Iroquois held undisputed sway, being composed of the Senecas, Oneidas, Onondagas, Cayugas, and Mohawks. They had conquered their kindred tribes speaking the same dialect, the Eries and Andastes, who roamed the southern shores of Lake Erie; and had also brought under subjection the mighty Hurons, who occupied the whole region of upper Canada.

Although the number of tribes occupying the vast territory of the Great Lakes would indicate a considerable population, to place the aggregate at fifty thousand would approach, and perhaps exceed, a true estimate. There were broad sections of primeval forest through which the savages seldom or never trod, and "Ohio, a part of Indiana, and the greater part of Michigan remained open to Indian immigration long after America began to be colonized by Europeans. From the portage between the Fox and the Wisconsin to the Des Moines, Marquette saw neither the countenance nor the footprint of man. In Illinois, so friendly to the habits of savage life, the Franciscan Zenobe Membre described the only large village as containing seven or eight thousand souls; and other missionaries who made their abode there related their appalling journeys through absolute solitudes; they represented their vocation as a chase after a savage that was scarce ever to be found; and they could gather five, or perhaps only three, villages in the entire region."

The first instinct of the savage was of war and strife;

he would tramp through the pathless forest or paddle his canoe through the lonely streams for days, subsisting on parched corn or the fruits of the chase; he would endure the greatest hardships and dangers in seeking revenge, and once having satisfied the craving for the blood of his enemy, he would as silently return to his wigwam. His trophies of victory, which were sacredly guarded and which accumulated as he advanced in years and prowess, were proudly displayed as he recounted over and again his exploits and those of his ancestors. At home he was fond of idleness, and his greatest toil was in repairing the cabins, in constructing canoes, or in making ready the implements of war and of the chase. The squaw was the laborer, and she bore the burdens of life. With only a shell, or the shoulder-blade of a buffalo, she planted the corn or the beans; and, watching their growth and breaking the weeds, in due season she gathered the harvest. If the Indian killed some game, she brought it home; she carried the wood, drew the water, and prepared the food. When the chief laid the keel and frame of a canoe, it was the woman who stretched the thin bark and stitched it and made tight the overlapping joints.

The first canoes to float on the waterways of the Inland Seas were crude dugouts, called in the Indian dialect "pirogues," in which the savages paddled or poled the streams in quest of game. In shape and method of making they well represented the rough and unskilled work of primitive man. The hollowing and fashioning of them from huge logs was ever the greatest labor of the Indian warrior, and he did not often undertake the task. When he had no means of navigating the streams or lakes, he would follow the bank of a wooded watercourse, and, upon finding a giant of the forest, preferably of red cedar, straight and clear to the lower branches, he would fell it by dint of toil, as the stone hatchet was his only tool. If the tree, perchance, fell over the water, he was

pleased to find the trunk in a position for easy launching when it should have been shaped into the canoe. Then with rude tools he would chop away the ends into some semblance of prows, and by fire and the stone hatchet would dig out the inside. At best the pirogues were heavy and unwieldly boats with little carrying capacity in proportion to their bulk. They were hard to propel against a swift current, and for use in the open lake, a sort of outrigger was attached to prevent their swamping. If high at the ends and dug out as deep as the log would admit, one could carry four passengers and a crew of paddlers of the same number.

The birch-bark canoe, which was so well adapted to the needs of the western Indian, may properly be considered the real precursor of the great fleets of white-winged vessels which sailed the lakes during the first half of the nineteenth century. The model of this light and graceful craft has been preserved through the generations, and is exemplified to-day in the easy lines of the pleasure craft so much in favor on the rivers and lakes throughout the country. The canoe of the Indians was constructed wholly of bark of the birch, splints of the cedar, roots of the spruce, and pitch of the white pine. These materials, which were common to a vast region from Hudson's Bay to the foot of Lake Erie, were fabricated in an astonishing degree of lightness and strength, the finished canoe floating lightly on the surface of the water. The Indians first cut down a birch tree and with much skill and care they stripped the bark in one long piece; they cut and shaped the keel and the ribs of red cedar; they dug the small roots of spruce and gathered a supply of gum of white pine.

With all these articles assembled on the ground the diminutive shipyard became a scene of gay activity. The chief laid the keel, the warriors bent and secured the ribs, and when they were all in place, the frame was strengthened with cross-pieces connecting the gunwales. At this

stage the squaws, who had been cutting and preparing the bark, came on the scene to do the part of the work which custom and tradition demanded of them. They fitted the bark closely over the skeleton frame; they sewed it with the "wat-tap" to the ribs and keel, and also the overlapping joints; they filled the openings with the white gum and smoothed off the edges, and they rubbed the wood and polished the bark. The warriors then added the last touches to the finished canoe by decorating its bows with symbols of the tribe. The forms thus painted in bright colors, red, yellow, and green predominating, were often of curious and fanciful designs, adding a mystical charm to the water scene. It was, indeed, an imposing spectacle when, at an early hour of a still, summer morning, a gayly decorated fleet of canoes filled with savages bent on the chase, pushed out from the shore of a little bay or inlet, the wet paddles flashing in the sunlight, and soon disappeared behind some headland. The scene was vividly repeated at sundown when the party returned, the canoes well filled with all kinds of game, or with whitefish, which abounded in the waters of the lakes and rivers.

The canoes intended for purposes of war or of trade were from thirty-two to thirty-five feet in length, and from five to six feet in width as measurements are reckoned to-day, and their carrying capacity was enormous. They were so well suited to the country as to be used exclusively by the early explorers who traversed the St. Lawrence and the Ottawa Rivers to the upper lakes. Every traveller used them, from the first lake voyage of Father Marquette, as also La Salle, Hennepin, La Hontan, Charlevoix, Henry, and Carver, in the order of their explorations, even to the time of Sir Alexander Mackenzie. They supplied all the simple needs of the savages and the few requirements of the hardy adventurers, who readily adopted the customs and usages of the aborigines.

With the coming of the barterers, those crafty white

men who exchanged the guns and trinkets of Europe for the furs of the Indians, the birch-bark canoe became the all-important mode of conveyance. Little groups of them dotted the shores and rivers in the long journey from the upper lakes to the Niagara portage or beyond to Quebec, a single canoe often being laden with as much as three tons of valuable furs. The cargo usually consisted of sixty packages of furs weighing ninety pounds each, which with the additional weight of the men and their camp outfit and supplies *en route,* brought the total to fully four tons. So heavily laden a canoe settled deep in the water, requiring the united efforts of eight Indians or as hardy Canadians to propel it against the current of the streams or over the swells of the troubled lakes. In calm weather they were able to paddle about four miles an hour; and they followed the shores closely, for the frail craft were easily broken, but they did not venture to approach a rough coast. If a sudden storm rose while they skirted a rocky shore, the supplies were first carried ashore upon the backs of the men, and then the furs or goods composing the cargo were safely landed. If rain fell in torrents, as was usual in the thickly wooded country, the lightened canoe was easily drawn up and turned bottom up over the pile of goods.

To the native sons of the forest and the sturdy mariners of those early days, the drenchings and discomforts of the voyage were little thought of as hardships, as such incidents and exposures to greater dangers were but parts of a rough life to which they were inured from childhood. They had no more thought of the morrow than the birds which flew through the branches of the trees above them. The whole responsibility and direction of the journeys they willingly delegated to their leaders, men who wielded the paddle and shared the dangers as themselves. Of the relations existing between the early fur traders, the voyagers, and their savage allies, Mr. Parkman graphically records:

"The intercourse between the civilized and uncivilized parties of men was truly fraternal. The French conformed, as far as possible, to the modes of life of the Indians. They shared their games; they married the daughters of the chiefs, and in all points endeavored to identify the interests of the natives with their own. Marquette had remarkable facility in the acquisition of languages. He could speak fluently the languages of all the tribes on the St. Lawrence, of which there was a general resemblance. Taking Indian guides with him he made tours in various directions, paddled by Indians in a birch-bark canoe. He visited many tribes, met their chiefs at the council fire, slept in their wigwams, administered medicine to their sick, and, through all these ministrations, he was as safe from harm as he would have been on the boulevards of Paris."

In midsummer, bright, clear days with scarcely a flitting cloud in the sky or a ripple on the calm waters are not unusual on the Inland Seas, but any one who has witnessed the grandeur with which the ocean-like billows of Lake Huron often break upon the western shore, will wonder how it was possible for the frail canoes of the primitive settlers to ride over its surges. Settled so low in the water as to seem almost buried in the waves, yet the buoyant canoe was kept bobbing lightly on the surface and with hardly a dash of spray, all by the most dexterous use of paddles in the hands of skilled natives.

When landing for an encampment at night or forced to take shelter from storms, which are prevalent during the Fall months throughout the lake region, the voyagers easily drew up their canoes upon the sands, and turned them over as a protection from the rain. Then, upon entering a little way into the dense forest, which from time immemorial had fringed the shores of the lakes, they speedily reared a sort of shelter made of the branches of trees and covered with leaves and moss. They spread mats on the ground, built camp fires, whose brilliant blaze enlivened the scene, and settled themselves in the forest abode which presented all the comforts of which they could dream. They cooked their suppers of corn bread and venison or bear steaks, which health

and hunger rendered most delicious. They sang songs, told stories, cracked jokes, and enjoyed the wild life even more perhaps than the hunters and fishermen of to-day in the north country. Toward the close of the navigation season, when the lakes were almost constantly lashed into frightful furies by the Fall gales, canoe parties were often held from three to five days before they dared venture upon the still angry seas. Even with the utmost care in handling the frail canoes, they were sometimes wrecked, or more often the thin skin of their bottom was punctured by a projecting rock. To quickly make the needed repair the voyagers always carried a ball of "wat-tap" stitching root, a good-sized lump of the white gum, and a few pieces of dry and thin birch bark. With these simple devices and their hatchets and guns, and relying upon their own clear judgment and valiant and resolute spirit, they were well prepared to combat the elements both of the earth and the sky.

As time went on and the fur trade increased, the genius of the French evolved the bateau and, a little later, the Mackinac boat, both of which, being built wholly of wood, proved much stronger and more seaworthy craft. The bateau was a light boat made of flat pieces of wood hewed or sawed from red cedar logs, so shaped and fastened together with iron bolts or round wooden pegs as to give strength and buoyancy. It had no keel for none was needed, as the flat bottom and reinforced strips and strengthening ribs answered the purpose, and gave rigidity to the handy boat. It was very long in proportion to its width, and because of its high projecting bows and sloping sides required great skill in navigating. Some bateaux were of nearly three tons' burden, and three or four men could propel one against a swift current of the streams by the use of oars and poles.

The Mackinac boat was the earliest type of barge used on the western waters, and was somewhat larger than the other craft then in use. It was constructed of

red or white oak boards, with a flat bottom and rather blunt bows, over a stiff heavy frame, and was well adapted to carry large burdens. Being too unwieldy a craft to paddle, it was towed or poled along the shores of the lakes and through the rivers by the force of human strength. This type of boat was also called "the marine of the lakes."

During the period about 1669, the whole of the great Northwest was an unknown land, and no one was certain whether the continent extended one thousand or five thousand miles to a western ocean. It was the general impression among the early colonists that the waves of the Pacific washed against rocky and forbidding shores a few miles beyond the "inland ocean," the furthermost link in the chain of Great Lakes which fringed the southern shores of Canada. In 1664, Fathers Marquette and Dablon had established the mission of St. Mary, near the head of the strait connecting Lakes Superior and Huron, — the first settlement of white men within the limits of the Northwestern States. To La Salle is honor due as being not only one of the first explorers to navigate the coasts of the lower peninsula of Michigan, but he was the first of all white men, so far as known, to penetrate its interior.

After some years the sailing vessel appeared, a type which, in the history of all civilized nations, is "the child of antiquity," as it formed the primitive cradle of the human race. It relies, however, entirely upon its good genius, that mysterious and invisible force which comes from on high.

CHAPTER III

LE GRIFFON, THE FIRST SAILING VESSEL

La Salle and the Building of Frontenac — His Plans — Granted the Seigniory of Frontenac — Expedition to Niagara — Discovery of the Cataract — Settlement Established above It — Second Party with La Salle Arrives — Lays Keel of Vessel — Hostility of Indians — Council Fire and Pipe of Peace — Discontent of Workmen — La Salle Returns to Frontenac — Tonty and Men Rush Completion of Vessel — Fur Trade and Exchanges.

IN all the annals of exploration of the American continent it would be difficult to find more thrilling and fascinating adventures than those of the early French explorers, or more impressive ministrations than those of the Jesuit and Recollet friars who always accompanied them on their journeys. Delving into the musty and fragmentary records of a period two and a quarter centuries ago, and with access to the narratives of Fathers Hennepin, La Motte, and others, the wonder grows that so small a band of men and zealots, brave and fearless though they were, in the face of hidden dangers and among hostile savages, should have accomplished so much of settlement and mission work; and that it all should have resulted so little for the flag of France.

Far above the stirring events of that epoch and of the utmost human interest, is the story of the building, fitting out, and voyage of the *Griffin*, which was the first vessel ever to unfold sails to the winds of the great Inland Seas. Built in the dense wilderness under great difficulties, it was the child of one man's boundless ambition — an unconquerable craving for discovery — to bring to the knowledge of the world the unknown. To

seek a direct northwest passage to China and Japan, through which the ships of France might extend their trade with the far distant lands, was the highest ambition of René Cavelier de la Salle, whose name, of all others that shed lustre upon the French discovery in America, ranks with Champlain. His other ambitions of creating a monopoly of trade in furs with the Indians, and of conquest were quite subordinate to his desire for discovery, but were necessary to his purpose, and the *Griffin* was an essential link in the scheme. The building of Frontenac and the incidents of his career for a few years prior to the building of the vessel have so intimate and important a relation to that event, as to form an integral part of its history.

As early as 1660, the inhabitants of Quebec had been told by Indians of a mighty river, the great river, the "Father of Waters," majestically flowing from the unexplored solitudes of the vast wilderness in the great Northwest, far away into the unknown regions of the South. Ten years later the rediscovery and exploration of the Mississippi by Father Marquette and others gave new impulse to the ambitions of La Salle. When the event became known in the eastern provinces he at once laid plans for the establishment of a series of military posts and trading stations along the whole chain of the Great Lakes, and intended eventually to extend them to important points on the Mississippi and its tributaries. It was his further aim to plant the flag of France and to declare under the domination of the king the whole country drained by these waters. At this time many people believed that the Great River flowed into the Pacific, thus giving a direct route to the western ocean.

The sublime plan of La Salle, which could only be carried into execution by the continuous work of many years, met with the cordial approval of Count Frontenac, then governor-general of Canada, and he gave the gigantic scheme his full support. In 1673 an expedition

had started from Quebec comprising four hundred men, including the Indian guides, in one hundred and twenty canoes and two flat boats and led by Frontenac himself, to establish a fort at Cataraqui near the outlet of Lake Ontario. La Salle had been sent ahead to call a council of Indian chiefs of the Five Nations called Iroquois, and had been so successful in creating friendly relations with them that, when the expedition arrived, Frontenac found the Indian camp of sixty savage deputies drawn up to receive him. At the place of council, on the ground carpeted with canvas from the flat boats, the deputies squatted and smoked the pipe of peace. Frontenac sat surrounded by his officers, while Gavakonite, a noted chief and a friend of the French, opened the council with expressions of great respect and deference toward "Onondio," the name they gave to the governor of Canada. Frontenac replied:

"Children: Mohawks, Onondagas, Cayugas, and Senecas, I am glad to see you here where I have had a fire lighted for you to smoke by, and for me to talk to you. You have done well, my children, to obey the command of your Father. Take courage, you will hear his word, which is full of peace and tenderness. For do not think I have come for war. My mind is full of peace and she walks by my side. Courage, then, my children, and take rest."

In five days the council was ended, and having been given many presents and tokens of good will, the savages returned to their wigwams. The fort was rushed to completion and the expedition accomplished its purpose, at a cost of but ten thousand francs to the king. In this enterprise La Salle was one of the leading spirits, exerting a remarkable influence over the Indians, and well meriting the support of the governor-general.

Two years went by when, in the Summer of 1675, La Salle went to France. He carried letters from Frontenac to the renowned Colbert, then Minister of Finance and Marine, to aid him in securing a reception. Upon un-

folding his plans before the minister and the king, the project attracted attention and soon received due consideration. La Salle was finally authorized to reëstablish Fort Frontenac, at Cataraqui, then much reduced and falling into decay. The king granted La Salle the seigniory of Fort Frontenac and the surrounding territory, twelve miles long by one and a half miles wide, and the neighboring islands; and also granted unrestricted rights to trade with the Indians upon the entire length of the Inland Seas. La Salle, having received financial aid from his relatives, agreed, upon these grants, to refund the original cost of building Fort Frontenac, and to rebuild it of stone. "He was to maintain it at his own expense with a garrison equal to that at Montreal, and in addition fifteen or twenty laborers to form a French colony around it; to build a church whenever the number of inhabitants should reach one hundred; and meanwhile to support one or more Recollet friars, and to form a settlement of domesticated Indians in the vicinity." In return he was vested with the government of the fort and settlement, subject to the orders of the governor-general.

La Salle was then in a position to control the greater part of the Canadian fur trade; but with the most favorable opportunity for commercial gain, he was no mere merchant. What to others would have been sufficient to work out an immense fortune and control of the lake commerce, was to him only a means to the end he had ever foremost in mind, and no profit of trade could content the broad ambition of his scheming brain. Upon his return to New France toward the close of 1675, he at once collected a faithful band of sturdy men, and with supplies, arms, and tools for his building operations, he set forth for his domains in the wilderness. For more than two years he was employed in rebuilding the fort and stockade on a much larger scale than before, and, in using stone for the main walls, he had a fortress almost impregnable against attack by hostile savages. His

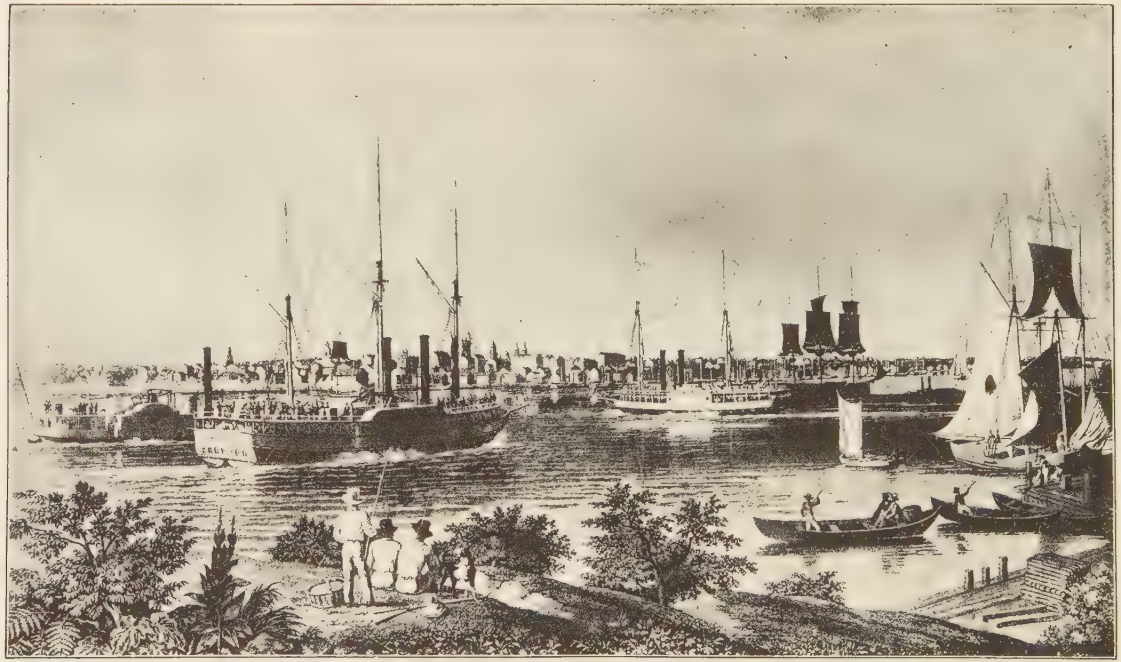
colony, like others of the period, was slow in gaining any considerable numbers, but the land was being gradually cleared and made fit for cultivation. In trade with the Indians he was most successful, and at every turn cemented the friendly relations with the tribes along the St. Lawrence.

But he was also planning weightier things than these. He decided upon an expedition up Lake Ontario and through the connecting river to the upper lakes and on to Superior, from the western end of which he confidently expected to find an easy communication with the Pacific Ocean. There was a glowing prospect of renown and the plaudits of the world in this conception. It would entirely change the thoroughfare of the world's commerce, and would make valuable beyond computation the possessions of France in America. He had meditated the building of sailing vessels to facilitate the commerce of the lakes, for the frail birch-bark canoe of the Indians was the only means of conveyance on the lakes and rivers. The largest canoes carried three tons of furs and with eight men to paddle them required many days for a trip along the shores, often storm-tossed, and at all times dangerous.

That Frontenac favored the building of wooden vessels propelled by sails is indicated in a letter sent some time before to the Minister of Marine:

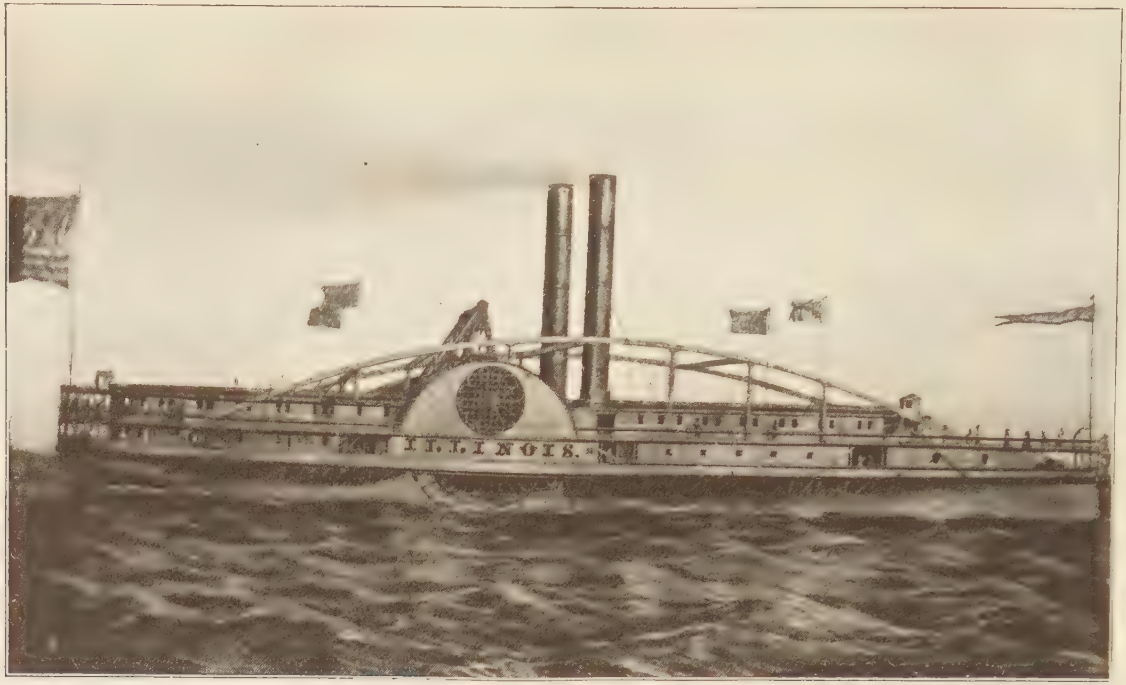
"The fort at Cataraqui with the aid of a vessel now building, will command Lake Ontario, keep peace with the Iroquois, and cut off the trade with the English. And that by another fort at the mouth of the Niagara, and another vessel on Lake Erie, we, the French, can command all the upper lakes."

At the close of 1677 it became necessary for La Salle to make another journey to France, chiefly to report in person of the progress made and to enlist new colonists in his broader scheme of discovery and conquest. At court he met with an even more cordial reception than before, and received from the king new honors and



STEAMERS *MICHIGAN*, *UNITED STATES*, AND *ERIE*, AND SAILING VESSELS, IN DETROIT RIVER

(From an old painting)



THE *ILLINOIS*, BUILT IN 1837-38

extended privileges. On July 14, 1678, he set sail from Rochelle for Quebec with a party of thirty men led by an Italian named Tonty, whom he made his lieutenant and who through a long association was the one man La Salle could rely upon for any duty.

After a hard voyage of nearly two months, the small band of hardy and brave men landed at Quebec, and at once made ready for the long journey of four hundred miles up the St. Lawrence. They paddled close to the shore to avoid the swiftest current of the river, passing many Indian villages and scattered wigwams. To surmount the rapids in the river, which they encountered soon after leaving the cluster of log cabins called Montreal, it was necessary to use poles to force the frail canoes against the rushing, tumbling waters, and several times they came near being wrecked. Heavily laden with articles for trade with the Indians, and with tools and chandlery for building and rigging of sailing vessels, besides the food supplies, the canoes were deep in the water, and it was only the skill of the Indian guides that saved them from disaster. They finally reached Fort Frontenac safely.

La Salle, whose plans were well formulated, at once set his carpenters to work building a small barge of ten tons' burden; and on the eighteenth of November, Father Hennepin, La Motte, and a small band of picked men, using paddles, poles, and aided by a piece of canvas stuck up for a sail, left the fort for Niagara. They kept close to the northern shore of Lake Ontario hoping thus to avoid the fury of the north winds, which at this season sweep the lakes, rendering navigation in such frail craft a hazardous undertaking. In eight days they reached the Indian village "Taiaigon," supposed to have been situated near the site of the city of Toronto, and ran for safety into a small stream. It was then so late in the season that ice formed during the night in the quiet waters of the creek, and the voyagers were forced to cut

their rude craft out with axes. On the fifth of December the party attempted to cross the lake to the mouth of the Niagara, but darkness overtook them and they were tossed about the troubled lake several miles from shore, during a comfortless night. The following day they entered the Niagara River and landed on the eastern side near the present site of Fort Niagara, where there was then a small village of the Senecas.

The mighty roar of the cataract was borne to the ears of the hardy voyagers, and Hennepin, eager with the spirit of discovery, at once set out with several others to ascend the river. The Indians told them of a great fall of the waters from a cliff higher than the tallest pines, and they pushed on to the foot of the mountain ridge of Lewiston, which to right and left forms the acclivity of a vast plateau. For seven miles the upland is rent with the deep chasm, along which from the foot of the cataract the gathered waters of four Inland Seas rush and tumble with the fury of an Alpine torrent. Landing on the west bank of the river the party climbed the heights and continued along the rough trail used by the Indians, until they came to an opening in the forest near the edge of the chasm. On a little projecting point of ground the explorers stood as the panorama of the falls spread before them, the first Europeans to behold the grand spectacle. The account of Galinée, in his journal, is the earliest description of the falls recorded. He wrote:

"We found a river one-eighth of a league broad and extremely rapid, forming the outlet from Lake Erie to Lake Ontario. The depth is extraordinary, for we found, close to shore, fifteen or sixteen fathoms of water. This outlet is forty miles long. It has, from ten to twelve miles above its *embouchure* into Lake Ontario, one of the finest cataracts in the world. All the Indians say that the river falls from a rock higher than the tallest pines. We heard the roar at a distance of ten or twelve miles. The fall gives such momentum to the water that its current prevented our ascending except with great difficulty.

The current above the falls is so rapid that it often sucks in deer and stags, elk and roebuck, endeavoring to cross the river, and overwhelms them in its frightful abyss."

The party kept on around the falls, and three miles beyond, at the mouth of Chippewa Creek where there were quiet waters well above the falls and upper rapids, they determined upon a spot for the location of the settlement and where they could build the vessel to be rigged with sails. The building of the wooden craft, in which they could navigate the upper lakes, was an arduous task. It was to be accomplished in the heart of Winter by a few men, at a distance of several hundred miles from any settlements. These men had first to construct their habitations and afterward to guard them from the Iroquois, whose every tradition was hostile to these inroads in their ancient domains.

Retracing their steps the next day they rejoined their companions on the lower Niagara, and finding their barge in danger from the mass of floating ice, they brought it up the river to the foot of the bluff and with great difficulty hauled it up on the western bank. Unloading the supplies and tools and the materials necessary for shipbuilding, they packed it over the Indian trail. After several days of the roughest travel they arrived at the place selected for the operations. To carry on the projects with any hope of success it was essential that they have the approbation and good will of the Senecas, the tribe residing in the vicinity, and to this end Father Hennepin, La Motte, and several others — all well armed — under the instructions of La Salle, went on an embassy to this nation.

They journeyed about ninety miles into the heart of the wilderness through snow knee-deep, to the great village of the Senecas. A council fire was kindled around which the Indians assembled with their usual gravity, speeches were made on both sides, and La Motte with a profusion of gifts and a promise to have a blacksmith

at Niagara to repair the Indians' guns, finally succeeded in their mission. The party went back to their settlement well satisfied, but arrived nearly famished and half-frozen by the severity of the Winter. Their builders had meanwhile set up log cabins and made ready for the coming of more workmen to rush the construction of the vessel, so that the long contemplated voyage to the Northwest might be made the following Summer.

La Salle, who had remained at Frontenac to look after and foster his trade with the Indians, — his friends the Hurons, — had also obtained consent from the Senecas to the building of the wooden vessel, the "big canoe." Everything being tranquil along the St. Lawrence, he set out with his second party about the middle of January and headed for the Niagara. In the clumsy barge was the full rigging, anchors, chains, small equipment, and five cannon, to complete what was to be the largest vessel yet launched in the fresh waters of the Inland Seas. Beset with furious gales and grinding ice, the little craft, with difficulty kept to the wind by the improvised and rude sail, made but slight headway and was tossed about the angry lake for several days and nights. Tonty, the pilot, and the crew labored incessantly to keep the crude barge afloat, and but for the cheery reassurance of La Salle, they would have given themselves up for lost.

When within thirty miles of the Niagara, a dissension arose at night between the pilot and some of the crew, and the craft was driven ashore on a sandy beach. The boat was wrecked but after great exposure in the icy water, La Salle, Tonty, and all the crew reached the land safely. All the supplies, provisions, and clothing were lost, but the rigging, cordage, anchors, and chains were saved and dragged along the beach to the mouth of the river. A few miles further on they came to a small cluster of Indian wigwams, the occupants of which received La Salle and his party kindly and with every mark of deference. They took the weary travellers into

their warm cabins, spread skins for them to sleep on with their feet to the fire, and laid before them their choicest bits of game. They brought whitefish in abundance, the flavor of which was deemed equal to that of the golden brook trout. This small Indian village was at the foot of the plateau on the site of Queenstown, Ontario.

After resting a few days and refreshing themselves, La Salle and his band of sturdy followers climbed to the top of the steep acclivity dragging the heavy equipment after them. It was now midwinter; the weather was intensely cold and the snow deep, rendering travel with burden extremely difficult. They struggled on in single file, and coming to the falls they gazed with amazement on the view spread before them. Pressing onward they soon reached the large log cabin in the midst of the dense forest. This was on the twentieth of January, 1679, and the little company, under Hennepin, were greatly cheered to hear the voice of their commander, who was in very truth the heart and soul of the expedition. The men had been busy erecting the warm cabins, cutting ship timber, and preparing ground for the building of the vessel, and were only waiting for more workmen to begin the actual operations of shipbuilding. A few days after his arrival, La Salle directed the laying of the keel of *Le Griffon,* which was the first wooden vessel under sail to voyage Lakes Erie, Huron, and Michigan. He himself drove the first bolt, and in every way offered encouragement to his men.

But the severity of the Winter was not the only difficulty and hardship encountered. Although the Indian chiefs had given their consent to the building of the vessel, the surrounding tribe was hostile and strongly objected to the erection of a fort on the lower Niagara, for such was a part of the plans of La Salle. The settlement was continually thronged with Indians curious to see all that was going on, and, while some were friendly, many more showed their disapproval of the shipbuilding,

and hindered the work in every way they could without causing an actual outbreak. The situation became so serious that La Salle deemed it necessary to call a council. When the chiefs of the neighboring tribes had assembled and smoked the pipe of peace, La Salle addressed them in convincing and honest words:

"I come to you as a friend and brother. I wish to buy your furs, and I will pay you for them in guns and powder, knives, hatchets, kettles, beads, and such other articles as you want. Thus you can do me good, and I will do you good. We can be brothers. I am building a boat that I may visit other tribes, purchase their furs and carry to them our goods. Let us smoke the pipe of peace and shake hands. The Great Spirit will be pleased to see us. His children love one another. I wish to establish a trading-post here where I can collect my furs and where you can come to sell them. And here you will find mechanics who will mend your guns, knives, and kettles when they get out of order."

All smoked the pipe of peace and grasped hands in token of friendship. La Salle agreed to modify his plans of building a fort on the lower Niagara, and a large warehouse protected by a stockade was determined on in its stead. The opposition of the Senecas to the establishment of a military force on the Niagara was well founded, for the location was the key to four great lakes above the falls, and whoever held it could control the fur trade of the vast territory beyond.

La Salle now believed that he had won the confidence and good will of the warlike Iroquois; but the clouds of misfortune still hung over his prospects, and cast a gloom upon the future that would have disheartened any man of a less ardent temperament and resolute spirit. It was not the suspicious temper of the Indians with which alone he had to contend. His men, who all along had seemed to have little interest in the enterprise, became discontented with their lot, and it was with difficulty that they were held to their tasks. The hardships and dangers of the frontier life and the difficulties under which

they labored in shipbuilding were alone enough to discourage them, had they not been tampered with as well by the enemies of La Salle. The unrestricted rights of traffic with the Indians amounting to a monopoly of the fur trade, the many advantages which the grants of the king gave him, and the large scale of his operations, excited the enmity of others dealing in furs, and the merchants of Canada, and they endeavored to thwart his plans.

To effect this end they sent secret agents out in the guise of workmen to every settlement to sow seeds of discord which they hoped would lead to mutiny and open revolt. They also sent men among the savages to arouse their jealousy by representing that La Salle's plan of building forts and vessels on the borders of their domains was intended only to command their trade by dictating the terms and curbing their power. La Salle was on his guard against these artifices, and they did not deter him from pursuing his purpose of pushing forward with all speed to the Northwest.

The work of constructing the vessel progressed slowly, for the timbers were green and wet, their tools were of the crudest kind, and the wintry blasts hindered the operations. The craft was to be of about sixty tons' burden, as we should figure its capacity to-day, and its design followed closely the prevailing type of the period in which the explorers had crossed the Atlantic from France to the New World. Leaving the building operations and his affairs in the hands of Tonty, La Salle returned to Frontenac, for matters at the fort demanded his attention. The maintenance of the fort and the expenses of the expedition had to be borne entirely by himself, and the profit derived from his trade with the Indians furnished the necessary funds. Stopping a few days near the mouth of the Niagara, he began the construction of the warehouse and permanent settlement to be enclosed by a stockade. This work progressed during

the Winter and became his base of supplies for the frontier portage around the falls.

Setting forth resolutely for the long journey of more than two hundred miles through the country of the Iroquois, La Salle was accompanied by only two men and a dog which dragged the baggage over the ice and snow. A sack of parched corn was the extent of the provisions, for they depended much on the game which abounded in the native forest. Upon arriving at Frontenac, La Salle at once laid plans and prepared for an extension of his trade in the Northwest. As soon as the ice had broken up along the shores of the lake he despatched fifteen men in canoes, laden with supplies and merchandise for the exchange of furs, to the trading-posts along the upper Huron and Michigan shores. These men were provided with every article of trade with the Indians, and in the collection of a large quantity of furs, La Salle hoped to place his financial affairs beyond any misfortune which might overtake him. His trading operations were on a large scale, and had he contented himself with building up the valuable seigniory of Frontenac, thus leaving the exploration of the Northwest to the missionaries, he could easily have controlled the entire fur trade of the interior. The profits of the fur trade were large, and it was simply an exchange of commodities. A poor Indian would bring in rich furs, to him scarcely of any value, but worth perhaps ten dollars in London or Paris. He would receive in exchange a strong, keen-edged knife, worth in London or Paris about a half dollar, but to him worth ten times the furs. His joy was great as he showed the keen cutting knives which shaved down the bows and arrows so smoothly in contrast to the laborious use of hard stones. Imagine the delight with which an Indian woman, for the first time in her life, hung a stout iron kettle over her cabin fire.

The following table taken from the "Voyage of Capt. Richard Lode" gives a clear insight into the terms upon

which exchanges were made with the Indians. Beaver skins were then the standard currency employed in trade, and values were based on them. The Indians gave in exchange for —

1 gun	10	beaver skins
½ pound of powder	1	" "
4 pounds of shot	1	" "
1 axe	1	" "
6 knives	1	" "
1 pound of glass beads	1	" "
1 laced coat	6	" "
1 laced female dress	5	" "
1 pound tobacco	1	" "
1 comb and looking-glass	2	" "

CHAPTER IV

THE LAUNCH AND VOYAGE OF *LE GRIFFON*

Completion and Launch — Fitting out and Armament — How Named — Tonty Heads Party to Trade on Lake Erie — Arrival of La Salle at the Chippewa Settlement — Sails Away on the *Griffin* — Meets Tonty and Party and Continues on through the Straits — Gale on Lake Huron — Arrives at Michilimackinac — Hostility of Indians and own Countrymen — Reasons for this — Sends Tonty to Sault Ste. Marie to Capture Deserters — *Griffin* Sails for Green Bay — Loads Furs and Starts Back under Command of Pilot to Michilimackinac and Niagara — Never Heard of After — Probably Wrecked — La Salle Continues Explorations Southward in Canoes.

WHILE La Salle remained at Frontenac the shipbuilders on the Niagara, constantly harassed by the hostility of the Indians, were applying themselves diligently to their tasks. The activity was largely a measure of safety to provide for their own defence, for to complete the hull and to launch it into the stream would give them a floating fortress, secure from any attack of the savages. On several occasions attempts were made to burn the vessel on the stocks, but with guards at night and constant vigilance the enemy's purpose was not accomplished. By April the work had so far progressed that Tonty decided to put the vessel in the water at the earliest possible moment. Early in May when all had been made ready, the vessel slipped into her natural element — the quiet waters of the stream — with loud shouts of the workmen and the roar of cannon and small arms, all of which made the forest resound with a tumult of sound such as was never before heard by the savages, who lined the shore and gazed with amazement upon the scene. That night the little band of men slung their hammocks under the deck of their ship anchored at a safe

distance from the shore, and with the protection of the terrifying cannon and their small arms, and with a watch on deck, they slept at ease for the first time in months.

They were hardly relieved from the danger of the treachery of the Senecas ere new difficulties arose to embarrass them. The supply of provisions had run low, and the canoes with abundant stores — sent by La Salle from Fort Frontenac — were wrecked on the bleak shores of Lake Ontario. To add to their distress the Indians would not sell them corn or procure game for them, and their mess was finally reduced to the game that two faithful Indian guides of the Huron tribe, who had come with them from Quebec, could procure for them.

The fitting out of the vessel continued and by early Summer it was completed and ready for its voyage of conquest and discovery, which, however, fate had decreed should not be realized. It was well rigged with sails unfurled from two masts, and amply provided with cordage, anchors, and cables, and powder and shot for the cannon. This part of the armament consisted of three brass pieces, about twelve-pounders in size, and two odd pieces called "arquebuses," which frowned ominously from the forward deck. The main deck was elevated well above the hull, and still above this extended a sort of upper cabin, the top of which was surmounted by the figure of an eagle. From the elevation floated the flag of France, the whole effect exerting a marked impression upon the unfriendly Indians.

The name *Le Griffon* (or *Griffin*) was given it by La Salle in honor of Count Frontenac, whose armorial bearings were ornamented with a figure of that mythical animal, which was frequently represented as a cross be-between a lion and an eagle, having the body and legs of the former and the beak and wings of the latter. Hennepin, however, in his narrative relates that the name was chosen by La Salle to protect the vessel against fire

with which it was threatened. With all the arduous work of constructing the vessel some of the more expert workmen devoted themselves to the carving of the large figure of the chimerical creature, which was placed with much pride and joy on the prow, and added much to the formidable appearance of the craft.

While waiting for La Salle to come from the fort with fresh supplies and merchandise, to take command of the expedition, Tonty, with a few select men, collected together what remained of the articles of Indian trade, and in canoes started on July twenty-second along the northern shore of Lake Erie. His purpose was to extend the trade to the western confines of the lake and to secure furs and supplies, the proceeds of which would go far toward stocking the warehouse on the lower Niagara. He finally arrived at the mouth of the Detroit River, the strait through which flows the combined waters of the three upper lakes. Here he waited for the coming of the *Griffin* with La Salle and the adventurers.

During the Spring and early Summer of this year (1679), while La Salle remained at Frontenac attending to his commercial affairs, he exerted every effort to counteract the manœuvres of his enemies, who were more active than ever in their attempts to defeat his plans. They caused reports to be spread that he was about to engage in a most hazardous undertaking, requiring a large expenditure of money, and from which there was little probability of his ever returning, and that because of his unyielding temper his fur trade would come to ruin. Alarmed at these rumors his creditors in Quebec seized upon his effects there and sold them at great loss to their owner. There seemed to be no remedy or recourse, and La Salle was obliged to submit to the vexations patiently, although his property at Frontenac and his lands surrounding the fort were of value more than double the amount of his debts. His undaunted spirit

and strength of purpose prevailed, and he was finally able to leave the fort with large supplies of provisions and goods for trade, bound for Niagara. Following the usual route up the lake in birch-bark canoes, they trailed around the falls, and on the thirtieth of July, came to the camp at the little shipyard. La Salle was overjoyed to find the *Griffin* fully equipped and ready for the voyage, and the men in good spirits with the prospect of further adventure.

The current of the river above the falls had hitherto been untried, and since it was very swift, La Salle did not venture to trust to the wind power of their sails alone in ascending the stream. By the aid of a long line stretched to the bank, the *Griffin* was cautiously towed by twelve men through the rapids and moored in quiet water at the head of an island, three miles from Lake Erie. This they named Squaw Island. For several days they were held there by contrary winds, but on the seventh of August, a brisk northeast wind was deemed favorable and, with thirty-four men on board, the sails were unfurled, the anchors raised, and the vessel's prow turned toward Lake Erie. As the balloon-like sails filled and the little vessel bore away against the current, the five cannon belched forth a salute, quickly followed by a rattle of musketry. The forest resounded with the joyful shouts of the men; and the great throng of Indians along the shore, augmented by a large band of Iroquois returning from the warpath, gazed in mute amazement on the novel scene. It was a matter of wonder to them that the "pale faces" should have built and armed a floating fort in so short a time. As the *Griffin* gained headway, and the Indians realized that it was sailing away, they gave vent to loud shouts of "Ot-kon, Ot-kon-oo," the name they gave the French, meaning "penetrating minds." The word corresponding to this in the Seneca language was "Ot-goh," meaning "supernatural beings or spirits."

The *Griffin* was soon well out of the river beyond the impediment of the current, and with the men chanting the "Te Deum Laudamus" and with the devotionals of Fathers Hennepin, Ribourde, and Zenobe, the explorers committed their destiny to the great waters. The vast expanse of the Inland Seas over which they were about to navigate had never floated larger craft than the frail bark canoe of the Indian, timidly coasting along the shores. But the little sailing vessel, manned by the intrepid voyagers, guided by the resolute spirit of their leader, ploughed its way into Lake Erie as a pioneer of the great fleets of modern lake commerce. Without a chart to mark the hidden dangers, or even a map to show the contour of the northern shore, they shaped their course boldly into the lake, confiding in the strength of their vessel and the skill and watchfulness of the mariners. They were fully aware of the perils of navigation in the open lake subject to the fury of violent storms, but were hardly prepared for the sound of breakers directly in their course. La Salle had seen a rude chart of Galinée's, made ten years before, and he remembered a point of land extending out into the lake southeasterly and near its eastern end. He ordered the course changed, sailing with a light breeze for several hours, and taking soundings constantly. Suddenly the depth registered only three fathoms, but the fog lifted at the moment and revealed close off their starboard bow the sandy beach of Long Point. The caution and vigilance of La Salle had saved them from probable wreck. They soon doubled the dangerous point, to which they gave the name "St. Francis."

Toward the close of the second day they approached the islands scattered so bountifully in the western part of the lake, from shore to shore of which extended unbroken forests without the faintest signs of habitation. The morning of the following day, with the lake smooth and with light winds, they doubled Point Pelee, and,

after passing many small islands in the distance on the port side, they set their course for the mouth of the strait which connects Lake Erie with the Lake of the Hurons. Early in the morning of the tenth of August, La Salle descried on the western shore the three columns of smoke which Tonty gave as a signal of the location of their camp. In a few hours the *Griffin* was anchored at the mouth of a small stream upon whose bank the leader of the expedition and his lieutenant met after months of harrowing adventure.

The following day the explorers continued their journey by sailing up the broad strait, but with the utmost vigilance, as hitherto these waters had been navigated only by canoes hugging the forest-bound banks. Hennepin was much impressed with the beautiful scenery of the straits, which he graphically described in his narrative:

"The straits are thirty leagues long bordered by low and level banks, and navigable for their entire length; that on either hand are vast prairies extending back to hills covered with vines, fruit trees, thickets, and tall forest trees, so distributed as to seem rather the work of art than of nature. . . . The inhabitants who will have the good fortune to some day settle on this pleasant and fertile strait will bless the memory of those who pioneered the way, and crossed Lake Erie by more than a hundred leagues of an unknown navigation."

As the *Griffin* was too large a craft to be propelled by oars or paddles, or to be poled against the strong current of the stream, their progress was slow, for they could make no advance except by strong southerly winds. In four or five days they had traversed the length of the lower strait, about twenty-eight miles, to which La Salle gave the name Detroit, and entered upon the waters of a small lake. The calendar day was the festival of Saint Claire, and as they sailed serenely over the clear blue waters, they named the lake after the patron saint. Its extreme length was about twenty-five miles, and at

its head the voyagers encountered a wide expanse of marsh, through which the upper strait flowed in numerous channels. Of these Hennepin wrote:

"We found the mouth of St. Clair River divided into many narrow channels full of sand bars and shoals. After carefully sounding them all we discovered a very fine one two or three fathoms deep, and almost a league wide through its entire length."

At this stage of the voyage they were delayed several days by contrary winds, but ere the week had passed they came in sight of the great bay of the Hurons, on the far eastern shores of which, sixty-four years before, their brothers had planted one of the earliest missions in North America. As they approached the troubled waters tossed by a northerly gale, the current became very swift and they could advance no further. The following day, the twenty-fourth of August, and the thirteenth after leaving Lake Erie, they resorted to the device of towing their vessel above the rapids, which Hennepin pronounced almost as strong as those at Niagara. In this novel and practical way they soon reached the deep waters of Lake Huron, and standing thus on an open sea, they felt more secure, and with renewed hope set sail for their northern destination, Michilimackinac.

It was about this time that La Salle found it necessary to take actual command of the *Griffin,* owing to negligence of the pilot, and it was well that he did so, for at night a fierce storm arose which increased to a gale, and the little craft was tossed about in the tempest which filled the boldest mariners with dismay. Even the resolute soul of La Salle quailed before the terrors that surrounded them; and through their united efforts to keep the vessel afloat, he resolved, if they should be delivered from their perils, that the first chapel erected in the newly discovered country should be dedicated to Saint Anthony of Padua, to whom their supplications were then being

directed. The pilot, however, bewailed his fate of perishing in a fresh-water lake, after having gained some renown in braving the storms and rage of the ocean in every clime. The fury of the tempest finally abated, the winds ceased, and as the waters became calm, the despair of the intrepid mariners was changed to rejoicing. On the twenty-seventh of August a favoring breeze carried the little vessel past the large island in the straits connecting Lake Huron with De Lac Illinois (Lake Michigan), and soon after it was anchored safely in the cove of the island called by the Indians, Michilimackinac, or the "big turtle." Here a scene opened up before them like a vision of enchantment. The waters of the bay on three sides were fringed with forest-covered hills, and on the sandy beach were clustered the wigwams of the friendly Hurons, Ottawas, and a few Frenchmen who were trading there.

The sons of the forest looked in wonder at the "big wood canoe," as they called it, the first they had ever seen, and their astonishment was increased when they went aboard and heard the roar of the cannon. A hundred canoes swarmed around the vessel bringing from the shore the squaws and half-naked children. In answer to the salute from the vessel, the warriors on land fired three volleys of musketry, and stood waiting to receive the voyagers. Aware of the influence of outward appearance and show on the minds of the Indians, La Salle clothed himself in a scarlet robe edged with gold, and wore a military cap highly plumed. Attended by his lieutenants, also well dressed and armed, he went on shore to make a visit of ceremony on the chiefs, and was entertained with great civility. The missionaries then celebrated mass in thankfulness for their escape from the fury of the waves.

On the opposite shore of the strait was a settlement of Hurons and the mission of St. Ignatius, which Father Marquette had established ten years before.

The habitations stood on an eminence and were protected by palisades; and they were well armed with guns obtained from the traders. The little bay formed a natural harbor of refuge from the fierce storms that swept the narrow straits from one lake to the other, and for other reasons was a decided point of vantage. When La Salle visited the mission he found the few settlers and the Indians not well disposed toward him, and he had not far to look for the cause.

The enemies of La Salle in Canada, not content with harassment at Quebec and on the Niagara frontier, had some time before sent emissaries on a like mission to the upper lake country. These men, by using the same specious arguments as had resulted in much annoyance and loss to the merchant explorer, had succeeded in deceiving the few of his countrymen in that region as to the true purpose and aim of the expedition. They had also poisoned the minds of the Indians, who had been made to believe that La Salle designed not only to monopolize the trade in furs, but also to invade their country and subdue them. Nor were the enemies satisfied to stop there, for they had attacked the expedition itself by waylaying the advance guard. The fifteen men sent ahead in the early Spring in canoes laden with merchandise for trading with the Indians had been tampered with, and about half of them had deserted, some of whom had joined the roving bands of Ottawas in the north country. Others of them, instead of going southward to trade with the Illinois, as they had been directed, had spent the Summer in hunting and fishing with the savages, and wasted the goods intrusted to them. After diligent search La Salle discovered and seized four of the deserters, and sent Tonty with two companions in a canoe to Sault Ste. Marie, to capture two others who, he learned, had joined an Indian camp in that vicinity. La Salle then set about to restore the prestige of his commercial affairs, and succeeded in his trade with the Indians to the extent of

securing several tons of skins which he stored at Michilimackinac.

As the season was well advanced and Tonty likely to be absent on his mission for a number of days, La Salle resolved to press forward without his lieutenant, and on September 12 set sail for the western shore of Lake Illinois. After a pleasant run of forty leagues, the voyagers sighted an island situated at the entrance of a large bay called " Le Grande Bay " (Green Bay), and in a sheltered harbor on the south side of the island they anchored the *Griffin* and paddled ashore. Here they found a village of the Potawatomies, who were very friendly, and La Salle was filled with joy to meet the others of the fifteen traders, who had remained faithful to their trust. They had visited the tribes along the bay and collected a large quantity of valuable skins, amounting to about ten tons, and had stored them, waiting the arrival of the *Griffin.*

Winter in the north country was now rapidly approaching and La Salle, fearful of having his vessel ice-bound for months in the harbor, decided upon an important move. He directed that all the furs in store there and as many more as he could secure be loaded in the *Griffin,* and that it be despatched to Michilimackinac. There the furs that he had collected were to be taken on and the vessel was to proceed to Niagara. From the warehouse on the lower river the valuable cargo of the *Griffin,* worth fully fifty thousand francs, was to be carried to Quebec to liquidate his debts, and reëstablish his credit where his affairs had suffered. This plan, which was evidently a sudden resolution, was not liked by the crew of adventurers, for they would be obliged to pursue their route in canoes, exposed to many hardships and dangers. But La Salle, who seldom asked counsel of any person, and was not easily diverted from any object upon which he had set his mind, doubtless thought that his men could not reasonably complain of hardships which he was to share in the same measure.

On the eighteenth of September, with a fair breeze and a smooth sea, the *Griffin* sailed away from Green Bay, with a crew of five men and the pilot Luc, gave a parting salute of a single gun, and soon passed from sight of her enterprising builder. He was destined never to see his vessel again, for it disappeared from the face of the waters, and was never after heard from. A severe storm had risen during the night, and while no trace of the little craft or of its cargo was ever found, it is probable that it was driven ashore and wrecked. In that case the crew must have perished, or, having been taken captive by the Indians, marched off to the great unknown regions of the Northwest.

La Salle at once reorganized his band of explorers, and resorting to the frail bark canoes, and with scanty supplies, they set out for the country of the Illinois, far to the south. As the months went by and no tidings came of the *Griffin,* he almost despaired; and as Tonty, who joined him on the southern shores of the lake, had no word of the missing vessel, he finally gave it and the rich cargo up for lost. The belief grew in him to a settled conviction that, on account of the former dissension with the pilot on Lake Huron, the vessel had been treacherously sunk by him and the sailors to whom it had been intrusted. They could have run it ashore easily and made away with the supplies and much of the furs, and become lost to civilization in the wilderness.

This conviction of La Salle was strengthened four years later by the report that an Indian, three years before, had seen a white man, who, from descriptions given, resembled the pilot, a prisoner among a tribe of Indians beyond the Mississippi. He had been captured with four others, on the Great River, while making their way in canoes laden with goods, toward the Sioux. These circumstances convinced La Salle of the fate of the crew, even if they did not hint of the disaster that befell his vessel. There is a tradition among the Jesuits that the *Griffin* was driven ashore during a gale, the

crew murdered, and the vessel pounded to pieces on the beach.

Of the end of the *Griffin,* Hennepin in his narrative wrote:

"The ship was hardly a league from the coast when it was tossed up by a violent storm in such a manner that our men were never heard from since. And it is supposed that the vessel struck on the sand and was there buried."

In the short space of one year the *Griffin* had been built, launched, fully rigged and armed as a floating fortress. It had voyaged throughout the length of two great lakes, and, venturing into still greater waters, had been lost, the sea giving up no evidences of its fate.

CHAPTER V

NAVIGATION FROM 1680 TO THE WAR OF 1812

La Salle Paddles down Illinois and Mississippi Rivers — First Sailing Vessel on Lake Superior — Trade during First Half of Eighteenth Century — Vessels Built during the Last Half of Same — Boundary Line between United States and Canada Defined — Tide of Immigration Sets in — After 1796 — Previous Routes of Travel — First American Vessel in 1789 — Its Voyage — Other Vessels and Traffic — Commerce at Beginning of Nineteenth Century — Naval Forces on Lakes — Earliest American War Vessels — Battle of Lake Erie in 1813.

THE loss of the *Griffin* with its rich cargo of furs, which were to have been used to settle a large indebtedness, was a severe blow to the commercial prestige of La Salle, and his financial affairs at Frontenac and Quebec for a time were in a precarious state. To add to his misfortunes and the difficulties of trade which seemed to be pursuing him, a vessel laden with goods for trading with the Indians was wrecked on the lower St. Lawrence River, and, there being no marine insurance in those days, the loss was complete and doubly felt. The destruction of his property at both ends of a long route, on the one hand the skins and peltries, the richest products of the country, and on the other, the articles of trade by which they were obtained, must have been discouraging enough without the constant scheming of his enemies to overthrow him. Through all his trials he maintained the steadfast purpose of exploration, and with Tonty and a few trustworthy followers, he pushed on toward the west and south. Descending the Illinois River and the Mississippi, the second party of Frenchmen to behold the Great River, the "Father of Waters,"

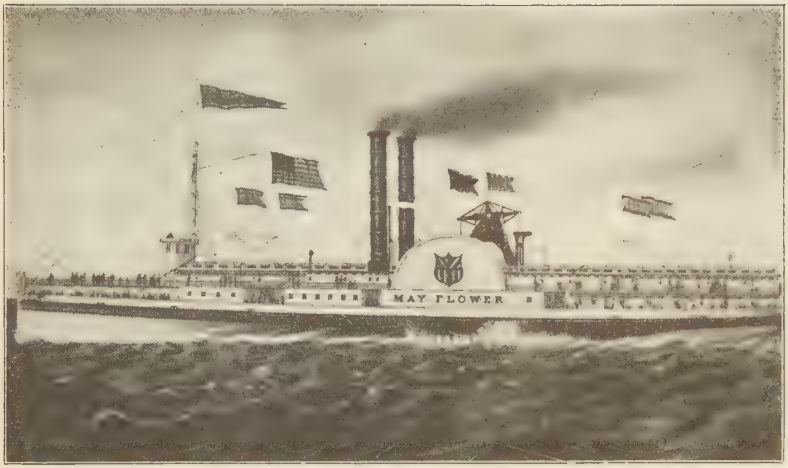
floated leisurely with the current, and passing many wigwams and some small Indian villages, they finally arrived at the mouth of the Arkansas. Here they determined beyond doubt the true outlet of the Mississippi.

The disasters which befell La Salle on the Inland Seas evidently were a deterrent to the fulfilment of any plan he may have had to build more sailing vessels, and other navigators of the lakes from fear of like ill fortune and from lack of rigging, anchors, hardware, and other materials, did not undertake shipbuilding. For nearly three-quarters of a century no sails were unfurled upon the waters of the lower lakes, the fur traders depending entirely upon the native canoes and the rude boats of their own making. In 1731, more than fifty years after the short career of the *Griffin,* La Ronde, a Frenchman, built the first sailing vessel, a bark of forty tons, on Lake Superior, and was rewarded with a monopoly of the fur trade at La Pointe, the only port on the south shore then and for a century afterward. All the materials, cordage, and anchors were transported from the lower lake port as far as the Sault portage in canoes, and, in the depths of the northern wilderness, just below the outlet of the Inland Ocean, the little bark was built. A large part of the furs traded from the Indians was brought from the Superior port to the portage in this small vessel, a traffic which it maintained until 1763, when it was wrecked on the bleak and rocky shore of the lake.

During this period in the settlement of the Northwest, the commerce of the lakes consisted almost exclusively of the fur trade, the transportation of men, arms, and stores to the military posts scattered at wide intervals along the chain of waterways, and the carrying of settlers, their families and goods to their new homes in the wilderness. Wheat and some other grains were then westward-bound commodities, as were also articles of wearing apparel, tools, rude instruments for tilling the soil, and an assortment of goods for trading with the

natives. While much of this traffic was carried in birch-bark canoes, the bateau and barge played an important part. They were being built larger and stronger, until the craft in use during the interval between 1750 and 1760 were of sufficient size to be called "vessels" by some of the early historians. Many of the boats were rigged with light masts and small sheets of canvas for sails, and were rendered seaworthy to meet the requirements of the times.

Carver, one of the early travellers in the lake region, relates that in June, 1768, he left Michilimackinac in the *Gladwyn,* a schooner of eighty tons, which had been built in 1763, and journeyed southward over Lake Huron and through St. Clair River to the lake bearing that name. There he left the vessel, which was the first to visit those parts since the *Griffin,* and proceeded by bateau to Detroit. Contemporary with the *Gladwyn* and likewise the first vessel bearing sails on Lake Erie after the historic ship of La Salle, was the sloop *Beaver,* which unluckily was lost at Catfish Creek, fourteen miles up the lake. A year later, in 1764, three new vessels appeared on the lower lakes, named the *Victory,* the *Boston,* and the *Royal Charlotte,* while in 1767, the *Brunswick* was built, and, two years after, the *Enterprise* was launched in Detroit. In May, 1770, the *Charity* of seventy tons' burden was put in the water on Lake Ontario, at the mouth of Niagara River; and was followed soon after by the *Chippewa,* the *Lady Charlotte,* and the *Beaver 2nd.* During the early part of the navigation season of 1771, the last named vessel was lost near Sandusky with its valuable cargo, three thousand dollars, and seventeen passengers and crew. That year the *Angelica,* of forty-five tons, was built and commanded by Richard Wright, at a wage of one hundred and twenty pounds a year. The sloop *Betsey* and the *Muskanungee* completed the list of sailing vessels to the period just preceding the Revolutionary War. In 1778, the British brig-of-war, *Gen-*



THE *MAY FLOWER*

THE *ATLANTIC*

The *Sunbeam*

eral Gage, arrived at Detroit, after a voyage of four days from the settlement of Buffalo; and two years after the little fleet was increased by the brigs *Dunmore, Faith, Hope, Welcome, Adventure, Felicity,* and *Wyandotte,* the crews of which were under pay; and a large dockyard was maintained. J. Collins, deputy surveyor-general of Canada in 1788, in an official report expressed the opinion

"that for Lake Ontario vessels should be of eighty to one hundred tons' burden, and for Lake Erie fifteen tons if intended to communicate between the lakes; but they should be built on proper principles for burden as well as sailing."

The permanent settlement of the region of the Great Lakes was a much slower development than that of the Ohio and Mississippi Valleys. There were various reasons for this. The Iroquois, or Five Nations, were at constant warfare with their affiliated tribes dwelling along the shores of the lower lakes, or were making incursions for plunder and bloodshed in the territory of the Illinois and the upper lake tribes of the nation of Algonquin. Another contributory cause was the close relation between the lakes and Canada. The boundary line between the United States and Canada was first established by the Treaty of Paris, which was signed on September 3, 1783. It was declared to be "a line drawn due west along the forty-fifth degree of north latitude until it strikes the Iroquois or Cataraqui [St. Lawrence] River; thence along the middle of said river into Lake Ontario; through the middle of said lake until it strikes the communication by water between Lake Ontario and Lake Erie; thence along the middle of said communication into Lake Erie; through the middle of Lake Erie until it arrives at the water communication between that lake and Lake Huron; thence along the middle of said communication into Lake Huron; thence through the middle of Lake Huron to the water communication between that lake and Lake Superior; thence along the watercourse and through

Lake Superior north of Isle Royal to Long Lake; thence through the middle of Long Lake to the water communication between it and the Lake of the Woods, to said Lake of Woods." By this treaty Great Britain claimed and held the islands in the Niagara River, but by the Treaty of Ghent, executed in December, 1814, the line was established as following the deepest channel, thus placing the islands on the American side. By the joint commission under this treaty the line from the St. Lawrence River to the foot of the St. Mary's River was determined in 1823; and from the outlet of St. Mary's River the line was established clear through to the farthest northwest point of the Lake of the Woods, by the Webster-Ashburton Treaty in 1843.

It was not until 1796, when Great Britain surrendered the posts commanding the lake trade, that the American tide of immigration turned toward the Great Lakes country, and followed the natural water highways. General Walker, superintendent of the tenth United States Census, has shown that

"early emigration from the Atlantic States westward was along four main lines, namely: through Central New York, following the valley of the Mohawk River; 2d, across Southern Pennsylvania, West Maryland, and North Virginia, parallel to and along the upper Potomac; 3d, southward down the valley of Virginia and through the mountain gaps into Tennessee and Kentucky; 4th, around the southern end of the mountains through Georgia and Alabama."

Prior to 1796, the last three routes were the channels of immigration almost exclusively used. At that time the western part of the State of New York was an unbroken wilderness, and seldom had the foot of civilized man trod the leaves and moss of the native forest. No road had yet been cut to the southern shores of Lake Erie; and Lake Ontario, the Niagara portage, and Detroit were in the possession of the English. Trails had been blazed and some roads made through the Ohio Valley

both from Philadelphia and Virginia points, and these were the routes traversed by a large part of the immigrants to the regions beyond the mountains, even those from New England. The tide of immigration having been established that way and disquieting reports of conflict and strife coming from the northern frontier, it was but natural that some time should elapse ere it was diverted to the lakes highway. Once having started by way of the easier route of travel through the natural watercourses, the route soon became the chief channel of western immigration, and the other routes became scarcely more than lines on the map. The British surrender of the outposts, in 1796, marked the beginning of the advancing wave of permanent settlement from the eastern interior, which is ever rolling on toward the West.

In these early times of lake navigation the few sailing vessels and the smaller craft were owned exclusively by the French and English voyagers, who controlled the trade of the Northwest. Not until 1789 was the first American vessel built and rigged out for trading along the shores of Lake Ontario, and its entry upon the Inland Seas was accomplished under great difficulty. The idea of trading with Canada was conceived by John Fellows, of Sheffield, Mass., who started from Schenectady, N. Y., in his little schooner, the cargo of which consisted mostly of tea and tobacco. He followed the natural watercourses leading toward the West, and finally reached the lake by way of the Oswego River. There the commanding officer of the outpost refused him permission to pass on to Canada to dispose of his goods, and he was turned back into the wilderness. He was not deterred from his purpose, however, and returning with his vessel and cargo up the Oswego River as far as the Seneca River, he followed that stream into the Canandaigua outlet to the present site of Clyde. There in the depths of the native forest he erected a log hut, which was long after known as the "blockhouse." In this rude shelter he

secured his wares while he was engaged in bushing out a sled road through the forest to Sodus Bay on Lake Ontario. His trail must have been nine or ten miles long, and when it had been made passable, he went to Geneva and procured two yoke of oxen. By these means he hauled the boat across the portage and launched it in the waters tributary to the lake. He then sledded the goods across and embarked in his frail boat and set sail for the northern shore of Lake Ontario. The tea and tobacco which he had thus laboriously brought to Canada met with a ready sale, and with the proceeds which represented a large profit, he returned in the vessel and landed at Irondequoit.

In 1792 a merchantman, named York, built on Lake Ontario a vessel named the *Missisaga,* and three years later a quick sailing sloop appeared named the *Sophia,* which, in May of 1795, ran from Kingston to Niagara in eighteen hours. This was considered a remarkably fast passage. At about that time American commerce on Lake Ontario began to expand, and until the beginning of the War of 1812, it amounted annually to a considerable volume. At the opening of the nineteenth century the trade of Lake Ontario exceeded the combined commerce of Lake Erie and the three upper lakes. The tide of immigration was slowly turning to the water highways, and to 1806, from New York to the western country, the route from the Hudson lay up the Mohawk River to the vicinity of Rome, N. Y. The traffic was maintained by small boats rowed or poled up the rapid and shallow Mohawk; wagoned around Little Falls and also at the divide between the river and Wood Creek; floated down that stream to Oneida Lake and through that to Three River Point, where the Oneida unites with the Seneca River. If from this point the traveller were bound for the settlements in the western part of the State, he followed the Seneca River, or if he were making for Canada or the far West, he floated down the Oswego

River to Lake Ontario. There he transferred with his property to coasting vessels destined for Lewiston or Queenstown. The long portage of the Niagara to Chippewa Creek followed, and the boating to Fort Erie, at the head of the river, where he embarked in a sailing vessel bound for the upper lake ports.

Among the vessels built after the close of the Revolutionary War was the *Jemima,* which was launched in 1798 by Eli Granger, at Hanford's Landing, three miles below the city of Rochester. In the same year the *Washington*, a schooner built at Erie, was carried on wheels around the Falls of Niagara, and launched in Lake Ontario. Being sold to a Canadian it plied between Queenstown and Kingston, under the British flag, and the name *Lady Washington.* It was lost in a gale near Oswego, on November 24, 1803. Other Canadian vessels were the *General Simcoe*, of eighty-seven tons' burden, built in 1797; the sloop *Polly,* built on the Bay of Quinte; and one or two others which traded between Kingston and the lake villages of New York State. Colonel Van Rensselaer built two vessels of fifty tons; and the *Peggy* and *Genesee* were schooners plying between Oswego and Niagara.

On Lake Erie before 1800, were the *Good Intent,* built by Captain William Lee, of thirty tons' burden, lost in 1806 with all on board; the *Harlequin,* owned by Eliphalet Beebe, and lost the first season with all the crew; the sloop *Otter,* which was the first vessel on Lake Erie to fly the Stars and Stripes, owned by James May; and the *Erie Packet.* Other sailing vessels on the upper lakes were the *Nancy,* of ninety-four tons, the *Swan*, and *Neagel;* the *Sagima, Detroit, Beaver, Industry, Speedwell,* and *Arabasca.* In the year 1800, the *Prince Edward*, built at Marysburg by Captain Murney, ran on Lake Ontario. This vessel was large enough to stow seven hundred barrels of flour beneath its deck. The *Speedy,* Captain Paxton, left York, October 7, 1804, for

Presque Isle, and was lost with twenty-four passengers and crew. The schooner *Columbia* was built in 1809 on an island at the lower end of Lake Ontario, and brought unfinished to Niagara, where it was completed and the name changed to *Niagara*. Other vessels prior to the War of 1812 were: the sloops *Marion* and *Gold Hunter*, the *Geneva Packet*, the *Diana*, the *Fair American*, the *Collector*, the *Experiment*, the *Dolphin*, and the schooner *Charles and Ann* which attracted considerable attention on account of her size.

During the first ten-year period of the new century the traffic of the lakes consisted of furs, skins, and peltries, stores for the military posts and the settlements in the West, and fish, lumber, staves, and household goods. Onondaga salt for Pittsburg was then one of the principal articles of lake commerce. In 1806, Porter, Barton & Co. established a regular transfer business over the portage at Niagara, and boating up the river to Black Rock. They maintained three yoke of oxen on the portage, and several yoke along the upper river to tow the boats through the swift current of the rapids near the head of the river, where their warehouses were located. The average load ascending the portage from Lewiston was twelve barrels of salt, or same weight in merchandise, and one trip a day could be made. Teamsters using horses could haul seven barrels of salt if the road was good. From fifteen thousand to eighteen thousand barrels of salt were hauled over the portage in a season. The rate was seven shillings per barrel for salt, and six shillings per one hundred pounds for general merchandise, from Lewiston to Black Rock; and three shillings for merchandise in the opposite direction.

The naval forces on the Great Lakes during the last half of the eighteenth century and including the War of 1812 comprised a number of stanch vessels, some of which had been taken from the merchantmen and converted into sloops of war. The first war ships were built

by the British in 1755 at Oswego for use on Lake Ontario. There were two sloops of war and one schooner besides some smaller vessels. One of the sloops had a gun deck on which was mounted eight four-pounders and thirty-two swivels. In 1771 there were built and armed under the British flag the schooner *Hope,* of eighty-one tons, and the *Angelica,* of sixty-four tons; and the following year the brig *Gage,* of one hundred and fifty-four tons with an armament of fourteen guns; and the schooner *Dunmore,* of one hundred and six tons; in 1774, the sloop *Felicity,* of fifty-five tons; in 1776, the sloop *Adventure,* of thirty-four tons; and in 1779, the sloop *Wyandotte,* of forty-seven tons. During the Revolutionary War the British built several vessels of war on Lake Ontario, the largest of which was the *Ontario,* carrying twenty-two guns. It was lost in a fearful gale in 1780 with one hundred and seventy-two lives, having a detachment of the Eighth King's Own Regiment on board at the time of the disaster. On May 3, 1793, the British ships *Buffalo* and *Caldwell* crossed Lake Ontario to York (Toronto) and joined the armed schooner *Onondaga.* At this time there were also the *Lady Dorchester* and the *Mohawk,* enrolled on the lower lake. On May 10, 1803, the Canadian government schooner, *Duke of Kent,* arrived at York from Kingston with troops.

The earliest American war vessel on the lakes was the United States sloop *Detroit,* of fifty tons, purchased by General Wayne in 1796. It had a short career as a government ship for it was wrecked near Erie in the Fall of the following year. In 1802 the Government built the brig *Adams,* of one hundred tons, which was sailed by Captain Breevort. It was surrendered to the British in 1812, and renamed the *Detroit;* was captured at Fort Erie by Lieutenant Elliot, and burned on Squaw Island, opposite Black Rock. The schooner *Tracy,* of fifty-three tons, was lost on a reef; the sloops *Catherine* and *Contractor,* built in 1802–3 at Black Rock, were both con-

verted into war vessels and renamed the *Trippe* and *Somers* respectively. They were in Perry's fleet in the battle of Lake Erie. In 1804 the sloop *Niagara,* built on Cayuga Creek, was never commissioned, but sold to traders and renamed the *Nancy.* At the time of the capture of the *Adams,* the Canadian armed brig *Caledonia* was taken, and after the war was refitted and renamed the *General Wayne.* The brig *Oneida* was in commission before 1809; and the schooner *Ontario,* built at Lewiston, was of seventy tons, and sold to the Government soon after the opening of the war. In June, 1812, the schooner *Salina,* formerly the *Catherine,* built in 1809, arrived at Mackinac and was captured with the schooner *Mary and Friends Good Will,* of sixty tons, by the British. While used as a transport by the enemy it was caught in the ice off Fort Malden and abandoned. It was later discovered off Erie, the supplies and rigging of value removed, and the hull burned. In 1810 the Canadian Government built the armed brig *Lady Prevost,* of ninety-seven tons, at Amherstburg. It was captured in the battle of Lake Erie, sold in 1815, and employed for many years in merchant service. The schooner *Chippewa,* of thirty tons, built in 1810, at Maumee, was captured during the war by the British, fitted out as a war vessel, and was in the engagement with Perry's fleet.

Among the British vessels during the war were the flagship *Detroit,* of nineteen guns; the *Camden,* of ten guns; the brig *Hunter;* the sloops *Hope* and *Nancy;* the schooners *Thames* and *Eleanor.* On Lake Superior, the *Perseverance,* of eighty-five tons, the schooner *Mink,* of forty-five tons, the sloop *Nancy,* of thirty-eight tons, were captured by the Americans in July, 1814. It is related that the schooner *Recovery,* built on the upper lake before 1812, was secreted by the British along the rocky and forbidding shores of Isle Royal, the masts taken out, and the hull covered with brush and branches of trees. It was not discovered, and after the war was

over it was put in commission, run down the St. Mary's Rapids, and engaged in the lumber trade on Lake Erie.

The battle of Lake Erie, which marked the crisis of the war and was one of the great historic events of the Great Lakes country, was fought on September 10, 1813. The naval forces of the United States on Lake Erie were under the command of Commodore Perry, an officer who, though but twenty-eight years of age, had seen much service and fighting on the high seas. He had collected and fitted out a fleet of nine vessels, comprising the brig *Lawrence,* his flagship, of twenty guns; the *Niagara,* Captain Elliot, of twenty guns; the *Caledonia,* three guns; the schooner *Ariel,* four guns; the *Scorpion,* two guns; the *Somers,* two guns and two swivels; the sloop *Trippe,* and the schooners *Tigress* and *Porcupine,* of one gun each; amounting in all to nine vessels, with a total armament of fifty-four guns and two swivels.

Commodore Barclay, who commanded the British forces on the lakes, had avoided an encounter with the Americans, but the conflict having been drawn from the land forces to that of the Inland Sea, he sailed forth with the full strength of his fleet, which was composed of the *Detroit,* of nineteen guns and two howitzers; the *Queen Charlotte,* of seventeen guns; the schooner *Lady Prevost,* of thirteen guns and two howitzers; the brig *Hunter,* of ten guns; the sloop *Little Belt,* of three guns, and the schooner *Chippewa,* of one gun and two swivels. The Americans had three more vessels than the British, but the latter had the advantage in number and size of their guns.

Toward noon Commodore Perry hoisted his Union Jack with the motto, the dying words of the lamented Lawrence, " Don't give up the ship," and set sail from Put-in-Bay, to meet the enemy. From the very beginning of the battle the *Lawrence* drew the fire of the entire British fleet, which soon rendered her unmanageable, and she was reduced almost to a wreck. Unable to further fire his

guns, many of which had been dismounted, he abandoned the flagship, and, with his colors under his arm, set out in a yawl to take command of the *Niagara,* which, some distance away, seemed unable to get into the thick of the engagement. Standing in the stern of his little boat, he was the mark for musket fire from the enemy's ships, but miraculously escaped unharmed. Assuming command of the *Niagara* and bringing her up to the line of conflict with the British ships, and aided by the other vessels of his fleet, which in the meantime had come within striking distance, he poured such deadly charges of grape and canister into the enemy's ships, that the whole of the British struck their colors, excepting the *Little Belt* and the *Chippewa.* These attempted to escape, but were overtaken by two gunboats and captured. The battle lasted three hours and the victory was most decisive and complete. The American losses were twenty-seven killed, and ninety-six wounded; and the British forty-one killed, and ninety-four wounded; Commodore Barclay being among the latter. Commodore Perry, who was unhurt, announced the victory in the message: "We have met the enemy and they are ours; two ships, two brigs, one schooner, and a sloop." This battle had a decisive effect on the fortunes of war, and led to the further invasion of Canada and victories on land, which resulted in the recovery to the United States of the lost territory of Michigan.

CHAPTER VI

THE BEGINNING OF STEAM NAVIGATION

Fulton, the Father of Steam Navigation — Early Experiments of Steam Propulsion —No Practical Results Followed — Symington's Steamboats in England — Fulton's Achievements in France — His Return to America — Building of *Clermont* — First Voyage to Albany — First Steamboat on St. Lawrence River — Also on Lake Ontario.

VIEWED in the light of the natural development in marine architecture through the centuries from the building of the Ark, steamboats belong exclusively to modern times, and represent progress, speculation, and haste. It is not much more than a hundred years since the experiments in steam propulsion of vessels, which had been carried on intermittently for twenty years preceding, began to assume a definite form along lines pointing to commercial success. Even in this age of rapid progress it is hard to believe that, in the course of one century, the slow and clumsy type of the Hudson River steamboats has developed into the present-day leviathans of the ocean and the Inland Seas. From the first successful steamboat, the *Clermont,* of Fulton fame, to the modern queen of the lake's craft, is a wide transition, the evolution showing speculation in the conveniences for the comfort and ease of the traveller, as well as in the decorations and exquisite furnishings to please his eye. Haste is manifest in high speed attained by the latest steamers with their powerful engines and mechanical equipment of great efficiency, over the slow-going sailing vessels whose motion is governed by the winds from above. But man, indeed, is ever the god of the steamer; it depends on him for its every movement; and without his guiding hand is but a helpless hulk upon the waste of waters.

In choosing some person from among the many of mechanical genius who are identified in the development of any great invention, whose name it is to bear in the generations to come, it is generally conceded that the honor should fall upon the man who has gathered together the more or less fragmentary work of his predecessors, stamped it with his own inventive originality, and given it to the world in practical working form. Upon these principles of selection, which have given the name to all modern inventions, posterity with equal impartiality has agreed to name Fulton as the father of steamboat navigation. There has been no intention in this of belittling the work of earlier inventors along the same line of experiment, some of whom actually moved small boats by steam power, but rather of placing an individual stamp of approval upon the type of steamboat, which has proved a mechanical and commercial success through the century, even to the present.

The earliest attempts to propel a boat by any form of steam power were as far back as the middle of the sixteenth century, when a Spaniard, Blasco de Gary by name, by some application of the heat energy of steam manœuvred a small vessel in the harbor of Barcelona. Nothing of practical use came of his efforts, and not until 1707 were further experiments made, by Papin, upon the river Fulda, in Germany. About 1763 William Henry built a steamboat propelled by paddle-wheels, but little success attended his work, probably because of the ineffectual means employed to apply the meagre power developed by the early steam engines of the period. Toward the end of the eighteenth century Count d'Auxiron and the Marquis de Jouffroy conducted experiments in steam navigation in France, with little practical result. The difficulties and discouragements experienced by the early mechanics were due to the fact that they were unable to obtain a speed of more than three miles an hour; and up to 1784, when James Watt, the accredited father of

the steam engine, gave to the world his first rotative engine for stationary purposes, the designs were not of a form suitable for use in the restricted space of a boat.

The use of the side paddle-wheels in Fulton's *Clermont* was undoubtedly a large factor in the successful operation of that historic pioneer of steamboating. The idea of revolving paddles attached to a vertical wheel was not new, as it was known to the Romans in the fifteenth century, for Appolo Vitruvius mentions the use of two wheel boats, one with a pair, and the other with five wheels on the side. These boats were operated by the force of human strength, and of horses or oxen. In 1710 there was printed in London a description of an engine for rowing boats, having "paddles or wheels of six or eight on each side of the ship, to be operated by hand labor through the capstan that was geared to the water-wheel shaft." According to the Jesuit missionaries at Peking, the Chinese in the eighteenth century had a sort of war vessel fitted with paddle-wheels on the side, which were turned by men.

The earliest application of steam power to operate the side-wheels was proposed in a description of a fire-ship that was laid before the Lords of the Admiralty in England, in October, 1796. In the same year Patrick Miller, of Dalwinston, Scotland, secured a patent for a vessel "to be put in motion during calms and against light winds by the means of wheels. These wheels project beyond the sides of the vessel, and are wrought by means of capstans. The wheels are built of eight arms, which consist entirely of plank." There is little in the records to show that any practical results followed these early experiments.

In America the idea of the vertical side-wheels seems to have been rejected by mechanics at the time of the introduction of Watt's steam engine. In 1785, in his paper on "Maritime Observations," Benjamin Franklin wrote:

"Several mechanical projectors have at different times proposed to give motion to boats, and even to ships, by means of circular rowing, or paddles placed on the circumference of wheels to be turned constantly, on each side of the vessel. But this method, though frequently tried, has never been found so effectual as to encourage a continuance of the practice. I do not know that the reason has hitherto been given. Perhaps it may be this: that a great part of the force employed contributes little to the motion."

He believed that too much power was lost in transmitting the mechanical energy of the engine to the immersed buckets, and of their loss of movement through the water, to make the wheel type of any practical use. That this belief was shared by others as late as 1798 is evident in the experiments conducted by Robert R. Livingston, John Stevens, and Nicholas J. Roosevelt, for when the latter proposed, "that we throw two wheels of wood over the sides, fastened to the axis of the fly-wheels with eight arms or paddles; that part which enters the water of sheet iron, to shift according to the power they require, either deeper in the water or otherwise," Livingston, who had a system of propulsion that he considered more practical than any other yet devised, replied that "vertical wheels, they are out of the question."

In 1784 James Rumsay experimented at steamboating on the Potomac in the presence of Washington; and John Fitch, of Philadelphia, three years later, operated the first steam vessel in this country on the Delaware, but the motive power was applied to rows of vertical paddles moved along either side of the boat. In 1789 Nathan Read, another American, equipped a boat with paddles moved by steam, at Danvers, Mass. None of these, however, achieved anything of practical utility, and their endeavors went for naught except to show the futility of the methods then employed. John Stevens did succeed, nevertheless, in 1804, in running a steam yawl from the Battery to Hoboken, which experiment resulted several years later in the *Phoenix* being sent to Phila-

delphia by sea, thus securing the credit of inaugurating deep sea navigation by steam.

Two other Americans, during the closing years of the century, were engaged in experimenting with side-wheels revolved by steam, but they sought some agent other than the paddle or bucket to take hold on the water, as these means were considered too absurd to be thought of for a moment. One of these experimenters, Samuel Morey, in 1797, constructed a steamboat on the Delaware River, of which he said:

"I there devised the plan of propelling by means of two wheels, one on each side. The shaft ran across the boat with a crank in the middle worked from the beam of the engine with a shackle bar. . . . I found that my wheels answered the purpose very well, and better than any mode that I had tried; and the boat was openly exhibited at Philadelphia, in the presence of numbers of citizens, with complete success. . . . It was only for want of funds that I did not then bring it into public use."

The other inventor, Daniel Keller, applied for a patent in 1795 "for an improved mode of propelling vessels by horses or oxen." This was the first patent issued in this country in which the paddle-wheel was described, and the fifth for an improvement, which read:

"And fixed on the shafts crossing the boat at a right angle, in the ends of the shaft projecting from or over the boat, are arms supporting the oars, paddles, or float dips in the water in a rotary succession by means of the power applied to the arms of the main horizontal wheel, and from that to the specified wheels and shafts, constitutes the means of propelling boats."

It is not thought at all likely that this patent had much to do with the final adoption of the paddle in Fulton's early models.

While these experiments were being carried on, on the British Isles other engineers of note were struggling with the problem, but, as in America, their endeavors met with meagre success. William Symington, a civil

engineer of Scotland, after years of study and experiment, attained the most renown in this field. In 1788 he built a steamboat to try out his ideas of steam propulsion, and two years later constructed a larger boat which was navigated upon the Forth and Clyde canal, at a speed, it is related, of six miles an hour. Because of lack of funds nothing was done for ten years to bring the vessel into public use, and it was only by the efforts of Lord Dundas, in 1801, that the inventor was engaged to build a steamboat to tow coal barges on the canal. The boat when completed was named the *Charlotte Dundas,* and after a trip to Glasgow, it was placed in service on the canal.

This steam towboat which, from the complete and probably authentic records of the time, must be considered a success in a mechanical sense, even though it brought no commercial return to its owner, was sixty feet long and, with its machinery, cost about fifteen thousand dollars. Its engine cylinder was twenty-two inches in diameter with four-foot stroke of piston, which was connected by a rod direct to the paddle-wheel shaft, the system which has been in use ever since. There was but one paddle-wheel, placed in the stern of the boat, and arranged so as to cause but little wave action outside. Of the engine Symington gave this description:

"In place of a cylinder erected in a vertical position with the piston rod acting upwards and the working beam and the other heavy and complicated apparatus of the old steam engine, I have placed the cylinder in a diagonal position, making with the horizon an angle of less than 45°, and by coupling to the end of the piston rod a crank and arm, reproduced a rotary motion without the intervention of a lever or beam, or the other apparatus connected therewith."

Although the vessel was a complete success and might have effected some economy in the operation of the canal, the owners of the waterway feared the waves from the boat's wheel would wash the banks away, and, after a few trips, its use was prohibited. In March, 1803,

Symington finished a third steamboat which, upon her trial trip, towed two loaded sloops twenty miles in six hours. Whatever claims any one of the early inventors may have had to recognition as the father of steamboating, the consensus of opinion, on the part of those who have made careful investigation of the historic facts, accords to Robert Fulton the distinction of placing on a regular route, running on schedule time, the first practical passenger steamer.

Robert Fulton was born in the town of Little Britain, Lancaster County, Pennsylvania, in 1765. At an early age his peculiar genius was manifested in his spending many hours in the shops of mechanics, and in the use of the pencil in drawing. By the time he was seventeen, he had become so much of an artist with his pencil in portraits and landscapes as to attract the notice of Dr. Franklin. In 1786 he went to England to pursue his studies, and for a number of years devoted himself to his art. His mind, however, was bent on mechanics, and in 1793 he was actively engaged in a project to improve inland navigation. At that time he had given some attention to the problem of steam propulsion of vessels; and in some of his manuscripts he expressed great confidence in its practicability. For some years he resided in the great manufacturing town of Birmingham, and it is probable that while there he acquired the practical knowledge of mechanics which he turned to such useful purposes there and later in his own country.

In May, 1794, he obtained a British patent on a double-inclined plane, to be used for transportation; and a little later another on a machine for sawing marble. He invented a machine for spinning flax, and a contrivance for scooping out the earth to form channels for canals. In 1796 he published his "Treatise on the Improvement of Canal Navigation" in which he advocated small canals and boats of little burden rather than of

canals and boats the size then in use; and the work was embellished by drawings and diagrams clearly showing his mode of conveyance over mountainous countries, independent of locks, railways, and steam engines. He wrote many essays on this subject, and on commerce and war, and became associated with distinguished men of science and of state.

In the year 1797, Mr. Fulton went to Paris and soon made the acquaintance of Joel Barlow, with whom, in December, he made an experiment on the Seine, with a machine he had devised as an improvement on the submarine bomb, and to which he gave the name "torpedo," by which such implements of war have since been known. In the Spring of 1801, he was engaged in making experiments with the plunging boat which he had constructed during the Winter, and, having corrected numerous imperfections natural to a first machine of such complications, he embarked on the third of July, with three companions, and descended in the harbor of Brest to ten, fifteen, and so to twenty-five feet depth, and, in utter darkness, remained an hour. Later he made a small window in the bow, of thick glass, and with a store of atmospheric air compressed into a copper globe of a cubic foot capacity, he and his companions descended on the seventh of August, and for six hours manœuvred under water, plunging, moving about at will at various depths, — as much as twenty-five feet, — turning and coming to the surface to determine their position, and again diving beneath. This was the first submarine boat of naval history, and Fulton gave it the name *Nautilus*. It was propelled on the surface by sails, as a speed of about two miles an hour. When they desired to plunge, the sail gear could be struck in two minutes; and while beneath the waves the submarine was moved by means of a sort of screw propeller under the stern, and secured to a shaft which was revolved by men, at a speed of somewhat less than one mile an hour.

These experiments were a complete success, exceeding Fulton's expectations, but the French Government gave him no encouragement as to the adoption of his inventions, and with great reluctance he turned to England for support and aid to improve his engines of war. In some of his experiments there his torpedoes blew several small vessels to atoms, and he otherwise demonstrated his ideas of naval warfare, which he believed if adopted would make war impossible. The Britishers, however, rejected his proposals, and, the year after, he returned to France.

At about this time, Robert R. Livingston was appointed minister to France, and, being interested in the development of steam navigation by his association in the experiments of Stevens and Roosevelt in America, he soon formed the acquaintance of Fulton, and persuaded him to resume his investigations of the problem. In his precise and practical way, Fulton never attempted to put in practice any ideas in mechanics without having made his calculations, drawn his plans, and executed his models. The theories of others that a boat might be propelled by forcing a column of water through a channel for that purpose in her keel, out at the stern, or of the use of a duck's foot model of paddle, or of Fitch's movement of vertical paddles, he quickly discarded, in these words:

"I believe it will be impossible to drive a boat six miles an hour by any method such as these; and it appears to me that it has been owing to such defective applications of power, and not to a want of it in the steam engine, that all experiments hitherto made, to apply it to navigation, have failed."

Fulton then took up the idea of using endless chains, with resisting boards, or chaplets, upon them as propellers, to be moved along a channel in the keel; but from the failure of the scheme as applied on the outside, as made by others at about the same time, he dropped

these investigations and reverted to the side paddle-wheels. During the Winter of 1802–3, he applied the wheels, as they were afterward used in the *Clermont,* to a working model, and in the Spring he constructed an experimental boat. It was too weakly framed, however, to bear the great weight of the machinery, and just as the try-out was to have taken place, a violent agitation of the river by wind, caused the boat to break in two and to be carried to the bottom. The machinery was very little damaged by the accident, and Fulton at once proceeded to rebuild the hull of heavy and strong timbers.

Early in August he had the boat, which was sixty-six feet in length by eight feet beam, ready for its trial on the Seine. In the presence of a great multitude of Parisians, the experiment was a complete success, although the boat did not move with as much speed as Fulton had expected. It resulted after a time in his resolve to return to his native land to further pursue his experiments there; and to this end, with the aid of Mr. Livingston, he ordered a cylinder and other parts of a steam engine from Watt and Bolton, of Birmingham, England. These parts were of a design that might be put together within the compass suited to a boat, and he directed that they be sent to America. Much delay attended the making of this engine, and it was not until the early part of 1806 that Fulton, after a visit to England to hurry along the machinery, returned to the United States.

Very soon after Fulton's arrival in New York, the keel of his new and much larger vessel was laid in the shipyard of Charles Brown, on the East River. The hull was one hundred and thirty-three feet in length, eighteen feet in breadth, and seven feet depth, and was strong and stanchly built. The engine from England was finished and set up almost amidships, as compactly as possible with the boiler and other machinery. The cylinder was twenty-four inches in diameter, with a four-foot stroke of piston, which was connected by a system

of working beam near the keel and ratchets to gears on the wheel shaft. The water-wheels were fifteen feet in diameter, and four feet the length of the buckets, with a two-foot dip. The tonnage was one hundred and sixty. Separate cabins were provided for men and women, and arranged with some idea of convenience and comfort.

Early in August the vessel was completed, and with many friends of the projectors on board, the *Clermont* put off from the wharf and slowly moved out into the river. Nothing could exceed the surprise and admiration of throngs of people who witnessed the experiment, and the minds of the most incredulous were changed in a few minutes, as she gained her speed, and they joined in the shouts and exclamations of congratulation and applause. Some alterations were made in the paddle-wheels, and on the morning of the eleventh of August, the *Clermont* started on a trip to Albany, where she arrived late in the afternoon of the next day, without an accident of any kind. Upon his return, Fulton gave out an account of the voyage, as follows:

To the Editor of the "American Citizen":

Sir: — I arrived this afternoon at four o'clock, in the steamboat from Albany. As the success of my experiment gives me great hopes that such boats may be rendered of great importance to my country, to prevent erroneous opinions and give some satisfaction to the friends of useful improvements, you will have the goodness to publish the following statement of facts.

I left New York on Monday, at one o'clock, and arrived at Clermont, the seat of Chancellor Livingston, at one o'clock on Tuesday — time twenty-four hours — distance one hundred and ten miles. On Wednesday, I departed from the Chancellor's at nine in the morning and arrived at Albany at five in the afternoon — distance forty miles — time eight hours. The sum is one hundred and fifty miles in thirty-two hours — equal to near five miles an hour. On Thursday, at nine o'clock in the morning, I left Albany, and arrived at the Chancellor's at six in the evening; I started from thence at seven, and arrived in New York at four in the afternoon — time thirty hours — equal to five miles

an hour. Throughout the whole way, both going and returning, the wind was ahead; no advantage could be derived from my sails; the whole has therefore been performed by the power of the steam-engine.

I am, sir, your obedient servant,

ROBERT FULTON.

During the first three months of operation, the *Clermont* was subjected to a number of changes in hull, paddles, and machinery, as suggested by the genius of Fulton, and he secured two patents for improvements, but in his whole career, he never claimed to have "invented" the steamboat. It was his theoretical knowledge of mechanics, and its practical adaptation to useful purposes, which accounts for his success in steam navigation.

The success of the pioneer steamboat soon led to the building of other vessels having the same motive power, of which the *Car of Neptune* and the *Paragon* were operated on the Hudson River. The cost of building and equipping a vessel of Fulton's type ranged from forty thousand to sixty thousand dollars; and only the most sanguine of the adherents of steam navigation ventured their money in the enterprise. Nevertheless, in ten years there were fifteen Fulton boats on New York waters; and others from Fulton's plans were built on the Mississippi and its tributaries.

Although the majestic St. Lawrence, in its flow to the ocean, forms the outlet of the combined waters of the Inland Seas, it is not generally included in the designation "Great Lakes"; but because of its intimate relation to these bodies, and its historic events pertaining to navigation being of no little interest, it will be considered a part of these waterways.

The first steamboat to ply on the St. Lawrence was the *Dalhousie*, which was built in 1809, at Prescott, Ontario. It had scarcely taken its route between that place and Montreal when the *Accommodation* was completed to run between the latter point and Quebec. This steamboat

was of the side-wheel type, following closely Fulton's models. It was built at Montreal, and of its first trip, the "Quebec Mercury," of November 5, 1809, said:

"On Saturday morning there arrived from Montreal, being her first trip, the steamboat *Accommodation*, with ten passengers. This is the first vessel of the kind that ever appeared in this harbour. She is continually crowded with visitants. She left Montreal on Wednesday, at two P. M., so that the passage was made in sixty-six hours. She has at present berths for twenty passengers, which next year will be considerably augmented. No wind or tide can stop her. She has seventy-five feet of keel, and her deck is eighty-five feet long. The price for a passage up is nine dollars, and eight dollars down, the vessel supplying provisions. The great advantage attending a vessel so constructed is that a passage may be calculated on to a degree of certainty in point of time. The steamboat receives her impulse from an open double-spoked perpendicular wheel on each side, without any circular band or rim. To the end of each double spoke is fixed a square board, which enters the water and by a rotary motion of the wheel acts like a paddle. The wheels are put and kept by steam operating within the vessel. A mast is to be fixed in her for the purpose of using a sail when the wind is favorable, which will occasionally accelerate her headway."

Between 1812 and 1818 there were built at Montreal for service exclusively on the river, the steamboats *Swiftsure, Car of Commerce, Caledonia, New Swiftsure, Malsham, Lady Sherbrooke, Telegraph,* and *Quebec 1st.* These were all flat-bottomed river boats, but in the Winter of 1816–17 a hull of entirely different proportions was constructed at Ogdensburg, and was the first steam vessel to be placed on water subject to a swell. From this was derived the true meaning of its being built to "test the power of steam against wind and wave." To construct any steamer for use on the waters of Lake Ontario, it was necessary to secure from the heirs of Robert Fulton a patent grant, and to this fact is attributed the ten years' delay in inaugurating steam navigation upon the Great Lakes.

The steamboat *Ontario* was launched in April, 1817,

but the action of waves and the rolling motion of swells were so little understood by the mechanics of the West, that on her first trip up Lake Ontario, the defects in the installation of her machinery nearly resulted in disaster, and she was taken back to port in a disabled condition. The paddle-wheel shaft, which in the river boats had been secured in place by their weight, were not held by other than wooden blocks, and the force of the waves soon lifted the shaft clear of any fastenings, causing the wheels to tear away their coverings, and to rack the machinery. After a proper device had been provided to hold the shaft in place, the steamboat made weekly trips between Ogdensburg and Lewiston, but the distance was too great, and in July the round trip was changed to ten days. The speed seldom exceeded five miles an hour, but the fare exacted for the through trip was fifteen dollars. The *Ontario* continued on the route until 1832, when she was broken up at Oswego.

The first Canadian steamboat on Lake Ontario was the *Frontenac,* built in 1817, and left Kingston on June 5, for her first trip up the lake. It was one hundred and seventy feet long by thirty-two feet beam, and had no guards except at the wheels. There were three masts, though no yards were carried. Being painted black, it had much the appearance of an ocean steamer of the period, and the cost was about one hundred thousand dollars.

CHAPTER VII

THE *WALK-IN-THE-WATER* — PIONEER STEAMBOAT STEAMBOAT

Causes of Delay in Inaugurating Steam Navigation on the Great Lakes — Building of First Steamboat — Name Suggested — Fulton's Plans — Dimensions and Description — Accounts of First Voyage to Detroit — Rates of Fare and So Forth — Its Wreck — Passengers and Baggage Saved — Machinery Recovered — New Vessel Planned — Rivalry of Buffalo and Black Rock — The *Superior* — Built in Buffalo Creek — Deepening of Channel Leading to Lake — Launch and Passage Out — Rapid Growth of Buffalo.

THE waters of the Inland Seas had not known the churn of paddle-wheels, nor had the Indians along their shores their first sight of the "big canoes belching fire and smoke," until about ten years after Robert Fulton had given the world its first successful steamboat. While this most important advance in the science of navigation had not been extended to Ontario waters, because the special grants given Fulton and his associates by the State of New York discouraged others from engaging in steamboating on those waters, the lapse in progress upon Lake Erie and the three upper lakes was due to very different causes. During the first decade following the momentous event in navigation, the settlements along the chain of Great Lakes and the connecting rivers were still very much in their primitive state; and the War of 1812 had checked immigration almost entirely. They had not yet reached the permanency of population to create a commerce requiring vessels as large or as costly as Fulton's steamboats.

The small sailing vessels were entirely adequate for the traffic, and it is related that the first merchant brig on the lakes, the *Union,* which was built at Huron, in

1814, although of only ninety-three tons' burden, proved too large for the business offered, and it was put out of commission. A contributory cause for the delay lay in the fact that the improvements made during the period were along lines adapted exclusively to the steamers in service on the Hudson and the Western rivers, which were built only for quiet and calm waters. Until 1813, two years preceding Fulton's death, the steamboat upon waters subject to wave and swell was still an untried experiment.

The first steamboat to ply regularly between ports on the Inland Seas, as a mechanical and commercial success and paying a fair dividend to its owners, was the *Walk-in-the-Water*. This singular name was suggested by an incident related by an old navigator of the lakes:

"When Fulton first steamed his boat, the *Clermont*, up the Hudson, in 1807, an Indian standing on the river bank, gazing long and silently at the boat moving up stream without sails, finally exclaimed: 'Walks in Water.' The man of the forest saw the boat stemming the current, unaided by any power known to him. He observed the paddle-wheels slowly revolving and intuitively comprehended that when a paddle struck the water there was a step forward."

The name *Walk-in-the-Water*, however, being so long was not generally used either in conversation or print. Being the only boat of her class on Lake Erie, where she plied regularly, she was usually designated as "the steamboat."

This historic vessel which well earned the title of pioneer steamboat on the Great Lakes, was built early in 1818 at the mouth of Scajaguada Creek, in the village of Black Rock. At that time and for several years preceding, Nathaniel Sill and two or three others had warehouses at Black Rock, situated nearly opposite the head of Squaw Island; and just below them was the shipyard which had seen the birth of many of the lake sailing craft. Excepting the few buildings and the surrounding clearings near the river bank, all the land in the vicinity

DETROIT IN 1820

(From an old lithograph)

THE WRECK OF THE *WALK-IN-THE-WATER*

(From a sketch in the possession of Mr. C. M. Burton, of Detroit, Mich.)

of Black Rock was covered with native forest. A large proportion of the timber was white oak which, as is well known, is the principal timber used in ship-building. This timber land extended over the greater part of what is now the city of Buffalo.

Much of the travel between the villages of Black Rock and Buffalo was by way of the beach, and passed the sand hills which had been thrown up and piled against the edge of the forest by the wind and waves. The place was known as "Sandytown," and it was at the foot of York Street, now Porter Avenue, Buffalo. There was excellent fishing off the sandy beach, which drew large numbers of the Senecas, and the camp became the rendezvous of the savage and warlike tribes. They collected quantities of driftwood which came down the lake and was cast up by the southwest storms, and their camp fires at night, lighting a considerable stretch of beach, formed a scene long remembered by the early settlers.

The keel of the vessel was laid by Noah Brown, who had built several of the steamboats running from New York; and the construction was according to plans by Fulton, and followed very closely the dimensions of the steamer bearing his name, which had been built five years before. The *Walk-in-the-Water* was launched on May 28, 1818, and was one hundred and thirty-five feet in length of deck, thirty-two feet breadth, and eight feet, six inches depth of hull, registering three hundred and thirty-eight gross tons. She had two masts carrying mainsail, foresail, and foretopmast staysail, which were always used when the wind was favorable. Her paddle-wheels were placed exactly amidships, and the machinery was below the deck. The boiler was forward of the wheels, and measured twenty feet long by nine feet in diameter, while the long smokestack pointed upward rakishly, the whole effect causing a native Frenchman, upon seeing the vessel for the first time, to exclaim, "Jean, Jean, just see! what are these Yankees a-sending us now but a saw-mill."

The machinery of this pioneer steamboat of the Inland Seas was of greatly improved design over that of the *Clermont,* for the development of the steam engine and the application of its power in the propulsion of vessels had been very rapid during the latter years of Fulton's life. The engine was of the vertical type, having a cylinder thirty-six inches in diameter by four feet stroke, and with its air pump, condenser, and connecting gear of an improved plan, it developed much greater power than any that had as yet been constructed. The paddle-wheels were fifteen feet in diameter, and the buckets were four feet, ten inches long, with a dip of two feet, six inches. Properly placed in the well-rounded hull of the sea-going vessel, the speed exceeded that of any steamboat of the times. It is an historical fact of some interest that the engines of the *Walk-in-the-Water* were in constant use during the navigation season for more than twenty years, having been installed in two successive hulls following the wreck of the pioneer.

The interior arrangement of "the steamboat" was calculated to afford a degree of comfort to the traveller, unknown in the sailing vessels; and in point of privacy the cabins were admirably planned. In the extreme bow was the galley, and next to it the dining-saloon, and small smoking-room. The baggage and cargo space extended from there to the boiler and engine room in the amidship section. Aft of the machinery was the men's cabin with its rows of berths, and in the stern the women's cabin, similarly arranged, was located. These cabins opened out into a vestibule from which the companionway led to the deck above. The high bow and stern, as faithfully portrayed in the contemporaneous drawings of "the steamboat," were features thought to give unusual sea qualities to buffet the wind and waves.

The *Walk-in-the-Water* was completed about the middle of August, her license and enrolment bearing the date of August 22, 1818. Her owners being mostly

residents of New York evidently were reluctant to trust their vessel to the navigation of fresh-water skippers, for they brought from the Hudson Captain Job Fish, to command. He had been an engineer for Fulton, Livingston & Co., and was known to be a careful and experienced sailor. The first pilot was John Davis, a lake sailor. Everything being in readiness the vessel cast loose from the natural rock wharf, which gave Black Rock its name, early in the afternoon of the twenty-third, and started on her maiden trip up the Niagara River. At that point the current of the river is very swift, almost attaining the force of rapids, and the little steamboat, her wheels churning the water into foam, could make no progress against it. Her twenty-nine passengers were beginning to wonder how the vessel was ever to reach the open waters of Lake Erie, only a few miles away, when they witnessed the application of a decidedly unique power to help them on their way. Captain Fish managed to send a line ashore supported by two skiffs, the shore end of which was hitched to a yoke of oxen, and by their efforts the vessel slowly ascended the river to the lake.

To the hundreds of inhabitants lined on the shore to witness the departure of the first steamboat to ply on Lake Erie, the scene must have been novel and picturesque. Only a little way from the bank the marine pride of the West was struggling with the swift current, her paddle-wheels revolving to their utmost speed, while her engine puffed and fumed and great clouds of dense smoke and red-hot cinders poured from her stack. On the beach the yoke of oxen tugged steadily at the end of a long tow line, the combined efforts of beast and steam proving sufficient to move the vessel forward. This was the historical "horned breeze" on the Niagara River brought into use when the current was stronger than the applied steam power.

An important article of equipment on the steamboat was a small cannon, a four-pounder, mounted on wheels

and securely fastened on the forward deck. Steam whistles had not been brought into use in those days, and the cannon was fired before leaving as a warning she would depart in a half-hour. On arrival off a village it was fired, a mile away, to let the people know she was coming. The third or fourth season after the steamboat was put in service, during a gale, the fastenings of the cannon became loosened and it was lost overboard. On all the chain of lakes there were no harbors other than formed by nature, at this time, and no docks or landings had been built on Lake Erie. The *Walk-in-the-Water* would run in as close to shore as the depth of water would admit and anchor, sending the passengers and goods ashore in a small boat. Upon running on the beach sailors took the women and children on their backs and waded through the surf to dry ground. If the weather was stormy or the lake too rough for making safe landings, the passengers and goods were taken on to the end of the route and brought back and landed on the return trip.

On her first trip the *Walk-in-the-Water* stopped at Dunkirk and Erie, and arrived off Cleveland about noon of the following day. Of this important event the account of an eye-witness is interesting as showing the incredulous attitude of the people toward a vessel propelled by power of man's creation. He relates:

"On the twenty-fourth day of August, 1818, an entire novelty — the like of which not one in five hundred of the inhabitants had ever before seen — presented itself before the people of Cuyahoga County. On that day the residents along the lake shore of Euclid saw upon the lake a curious kind of vessel making what was considered very rapid progress westward, without the aid of sails, while from a pipe near the middle rolled forth a dark cloud of smoke, which trailed its gloomy length far into the rear of the swift-gliding mysterious traveller over the deep. They watched its westward course until it turned its prow toward the harbor of Cleveland; and then turned back to their labor. Many of them doubtless knew what it was, but some

shook their heads in sad surmise as to whether some evil powers were not at work in producing such a strange phenomenon as that on the bosom of their beloved Lake Erie. Meanwhile the citizens of Cleveland, perceiving the approach of the monster, hastened to the lake shore to examine it. 'What is it? What is it? Where did it come from? What makes it go?' queried one and another of the excited throng. 'It 's the steamboat! that 's what it is!' cried others in reply. 'Yes! Yes! it 's the steamboat,' was the general shout, and with ringing cheers, the people welcomed the first vessel propelled by steam that had ever traversed the waters of Lake Erie. . . . The steamboat was of three hundred and thirty-eight tons' capacity, and could carry one hundred cabin passengers, and a still greater number could be accommodated in the steerage. Its best speed was eight to ten miles an hour, and this was considered wonderful. All Cleveland swarmed on board to examine the new craft, and many leading citizens took passage in it to Detroit, for which place it soon set forth."

Proceeding westward the steamboat shortly after midnight arrived off Sandusky Bay, where she anchored until morning, when she entered the bay and took on a load of wood. She then turned her prow northward by west, steaming among the islands of Lake Erie *en route* for the mouth of Detroit River. The welcome given the steamboat at Detroit, and the account of the entire trip from Buffalo, was graphically narrated in the *Detroit Gazette* of August 26, 1818:

"Yesterday between the hours of ten and eleven, A. M., the elegant steamboat, *Walk-in-the-Water*, Captain Job Fish, arrived. As she passed the public wharf and that owned by Mr. J. S. Roby, she was cheered by hundreds of the inhabitants who had collected to witness (in these waters) a truly novel and grand spectacle. She came to at Wing's wharf. She left Buffalo at half-past one o'clock on the twenty-third, and arrived off Dunkirk at thirty-five minutes past six o'clock on the same day. On the next morning she arrived at Erie, Captain Fish having reduced her speed during the night in order not to pass that place, where she took on a supply of wood. At half-past seven, A. M., she left Erie and came to off Cleveland at about eleven o'clock. At twenty minutes past six in the evening of the same day, she steamed from off Cleveland, and arrived off Sandusky Bay at

one o'clock in the morning, where she anchored until daybreak, when she proceeded up the bay to Venice to wood. She left Venice at three, P. M., arriving at the mouth of Detroit River, where she anchored during the night, the whole time employed in sailing in this first voyage from Buffalo to this town, being forty-four hours and ten minutes, the wind being ahead during the whole passage. Not the slightest accident happened during the voyage, and all the machinery worked admirably. Nothing could exceed the surprise of the sons of the forest on seeing the *Walk-in-the-Water* moving majestically and rapidly against a strong current, without assistance of sails or oars. They lined the banks near Malden, and expressed their astonishment by repeated shouts of '*Tai-yoh-nichee*.' A report had been circulated among them that a big canoe would soon come from the 'noisy waters,' which, by order of the Great Father of the Cho-mo-ko-mous, would be drawn through the lakes by sturgeon. Of the truth of this report they are now perfectly satisfied. The cabins of this boat are fitted up in a neat, convenient, and elegant style; and the manner in which she is found does honor to the proprietors and her commander. A passage between this place and Buffalo is not now merely tolerable, but truly pleasant. To-day she will make a trip to Lake St. Clair with a large party of ladies and gentlemen. She will leave for Buffalo to-morrow, and may be expected to visit us again next week."

During her stay at Detroit the *Walk-in-the-Water* was the wonder of all, and she was visited by many people, some of whom travelled from beyond the little settlement to see this marvellous craft. Among the curious ones were quite a number of Indians, who manifested great astonishment and wonder. In their way they wanted to see and examine everything about the boat. While they were very intently engaged in examining the engine which they understood "pulled" the boat along, the huge boiler and paddle-wheels, the engineer, Mr. Calhoun, lifted the safety lever letting off steam under its greatest pressure at the time. The Indians started with a spring, leap, and bound off and away from the boat, and ran up the hill, through the village, nor did they lessen their speed until they were out of sight of the white man's "big canoe."

For a long time after no Indian could be induced to approach nearer the hissing monster than the top of the hill.

From an old advertisement of the steamboat published in the *Niagara Patriot,* of September 15, 1818, some interesting facts of operation are obtained. In this curious sheet the sailings are announced as to take place "on the fifteenth and twenty-sixth of September, the seventh, seventeenth, and twenty-seventh of October; and the sixth and sixteenth of November, at four o'clock, P. M. Returning she will leave Detroit the twenty-first of September, the second, twelfth, and twenty-second of October, and the first and eleventh of November, at four, P. M." This shows that a round trip required about nine days, although the actual time of the steamboat while under way during the single passage between the two places averaged about forty-two hours, more time being spent at anchor, making landings, taking on wood for fuel, and lying at the wharfs at the terminal points. The distance covered in a single passage was about three hundred and twenty miles, giving an average speed of nearly seven and one-half miles an hour.

The fuel used in the boiler of the *Walk-in-the-Water* was entirely of bass, pine, and hemlock, all split fine and well seasoned. Hardwood did not seem to answer so well in the boilers then used, as that which would make a more lively and intense fire was needed. Bituminous coal had not then been brought into use on the frontier, and it would not have been used anyway. The wood delivered at the dock cost one dollar and a quarter to two dollars a cord, and the farmers along the lake shore, near the regular stopping places of the vessel, found it quite to their advantage to secure the contract for furnishing wood for "the steamboat." Many of them had quantities of dry seasoned fuel timber for sale, as they were clearing off their lands in preparation for cultivation.

The rates of fare early established by the steamboat,

including accommodations and meals, seem very high in comparison with the rates of to-day and were:

"From Black Rock and Buffalo to						Dunkirk,	$3.00	cabin;	$1.50	steer.
"	"	"	"	"	"	Erie,	6.00	"	2.50	"
"	"	"	"	"	"	Grand River,	10.00,	"	4.00	"
"	"	"	"	"	"	Cleveland,	12.00	"	5.00	"
"	"	"	"	"	"	Sandusky,	15.00	"	5.50	"
"	"	"	"	"	"	Detroit,	18.00	"	7.00	"

Waiters half price of cabin passengers. A cabin is fitted up for the accommodation of families, who with their baggage will be carried at very low rates."

These rates were afterward reduced to fifteen dollars, and again to twelve dollars from Buffalo to Detroit, and proportionately between intermediate points. In comparison with these, the rates of to-day on the fast modern lake liners vary from six to eight dollars, including berth and meals; and the distance, by the direct route of two hundred and sixty miles, is covered by the Buffalo boats in fourteen hours, or an average speed through the open stretches of the lake of twenty miles an hour. The stateroom accommodations of these great "side-wheelers" are eight hundred passengers; and besides, one thousand tons of package freight can be carried on the main deck forward.

The *Walk-in-the-Water*, during her short career, never entered the stream to Buffalo, for the very good reason that no harbor the waters of which would have floated her existed there. During the passages of the year 1818 it was the practice of the steamboat to haul to opposite Buffalo to take on and deliver passengers and baggage. When she started the navigation season of 1819, when passing Buffalo Creek, a yawl came out and the passengers hailed her. They were answered as she went steadily on her way with, "Gentlemen, you must distinctly understand that the port from which we sail is Black Rock." So the passengers were obliged to return to the little village of Buffalo, and they secured accommodations in a sailing vessel at anchor in the bay, or waited until the next

trip of the steamboat, ten days after, and then they went aboard at the dock at Black Rock. The most intense rivalry for supremacy existed between the two villages, and after many struggles for a decided advantage, the turning point in favor of Buffalo, and which made it a port and place of commercial importance, was the building of another steamboat — the successor to the *Walk-in-the-Water.*

The steamboat had continued in service during the seasons of 1819, 1820, and 1821, earning a handsome profit for her owners, when her short history was brought to an end by wreck on November 1, 1821. She had left her dock at Black Rock on her regular trip, at four o'clock, P. M., and upon reaching the lake encountered threatening weather. Continuing on her course for a few miles into the open lake, the rising storm compelled her captain to anchor for safety, near the shore. Toward morning the storm increased to a gale, which tore the vessel loose from her anchorage, and she was driven rapidly and helplessly on the shore. She struck the light sandy beach just above the old lighthouse, and nearly opposite the foot of Main Street, Buffalo. She was driven so high on the shore that the engineer, Mr. Calhoun, jumped overboard, waded to land, and started for the village to give the alarm, the catastrophe being hidden from the sight of villagers by the forest along the shore. General Lucius Storrs, Captain Benjamin Caryl, keepers of the Mansion House, and others quickly responded, and were soon on their way across the creek, hastening to the stranded steamboat. Aided by the efforts of Captain Rogers, Pilot William T. Miller, and the crew, the rescuers stretched a line from the vessel to the shore, along which a small boat was guided back and forth, thus landing all the passengers safely. They were taken to the Mansion House and given dry clothing, and otherwise made as comfortable as shipwrecked people could well be.

The stranded vessel did not at once go to pieces and the baggage and goods were saved during the day and taken to Buffalo. When the gale had subsided and the waters of Lake Erie had resumed their normal level, the wrecked hulk was found to be high and dry on the beach, and an examination of the machinery showed the engine and boiler to be but little damaged. The mass of broken wood and twisted bars had scarcely settled in the sands ere it was proposed to build another steamboat, and Noah Brown came from New York to contract for the work. The engine, boiler, and machinery were recovered from the wreck in good condition for use in the new vessel which was built during the Winter of 1821–22.

At this juncture a great controversy arose between the citizens of Black Rock and Buffalo as to the place where the new steamboat should be built, and it grew very bitter. For ten years preceding, Black Rock had been the principal port at the east end of Lake Erie, Buffalo, at the time being of much less importance, as the outlet of Buffalo Creek afforded only sufficient water for flat boats, and after a heavy blow there was not even that depth. The people of Black Rock declared that if the vessel were built in the shallow creek, it would rot before it floated on the waters of Lake Erie. Both places agreed to furnish all timber at a low price, and made other concessions, but in the end Buffalo prevailed by giving in addition, bonds for a large amount, guaranteeing that the channel of the creek would be deepened by a certain time so that the new steamboat when completed could be floated out into the lake. As a penalty the owners were to be paid one hundred and fifty dollars for each day it should be delayed after completion.

The deepening of the channel of Buffalo Creek was a great undertaking for the people in those days, but after heroic efforts the task was accomplished within the specified time, to the great joy of the inhabitants. Without the aid of excavating machinery, for such means

were unknown, the people devised crude scrapers and by great labor removed the sand from the waterway. First, piles were driven by means of a "driver," extemporized from an old mortar. A scraper was made of a log sawed in half lengthwise, and armed at the edge, thus left, with long saw blades. This crude and unwieldly device was floated into place by a scow and dropped to the bottom. It was then dragged out by oxen, bringing with it a small quantity of sand and silt. Judge Samuel Wilkeson was the leader of this project, and "his good works in creating Buffalo City were examples of energy, ingenuity, and persevering sacrifice."

The second steamboat on Lake Erie, the *Superior,* was built on Buffalo Creek, at the foot of Washington Street, and was launched on April 16, 1822. She was of different proportions than the *Walk-in-the-Water,* and although registering about the same tonnage, was one hundred and twenty-six feet length of deck, twenty-one feet breadth, and ten feet, six inches depth of hull. A streak through the woods was cut and a road built to haul the boiler and machinery of the wrecked vessel to the new hull, and it was installed in about the same position as originally placed in the wrecked hull. When completed the *Superior* steamed out of the narrow creek, and with some difficulty reached the open water of the harbor.

The *Superior* left Black Rock on her first trip for Detroit on April 23, 1822, but for some reason passed by Buffalo Creek, as the precursor of steam navigation on the Great Lakes had done. After her third trip on or about June 1 and ever after the *Superior* made Buffalo her stopping place. From this time Buffalo began to assume a superiority over Black Rock, in a commercial way, and the further deepening of the channel leading to the deep water of the lake, to accommodate all vessels of the period, together with the location of the terminal of the then building Erie Canal, seemed to settle the controversy between the rival villages, and Buffalo began to be

a place of importance. Very soon, merchants and others who had expected Black Rock to become the metropolis of the western lake country moved to Buffalo, and Black Rock was soon only a dot on the map.

In 1824 a sister ship of the *Superior* was built, and named *Henry Clay,* and during the season of 1825 the two steamboats maintained a four-day service between the ports of Lake Erie and Detroit. The *Superior* continued in service for some years, even after many larger and finer steamboats had been built and run in competition. She was finally converted into a sailing vessel in 1835, and the engine and machinery, which had done service in two hulls, were placed in a new vessel named the *Charles Townsend.* The *Superior* was lost in a gale in 1843. After 1825 the growth and development of steam navigation on the Great Lakes was very rapid, and in a few years had attained large proportions.

CHAPTER VIII

THE EARLY DAYS OF STEAM NAVIGATION

The Opening of the Erie Canal — Its Effect on the Development of Lake Commerce — Rates and Traffic of the Period 1825–35 — Steamboats Built — Navigation with no Guides or Warning Signals — The Steamer *United States* — The *Michigan* — Other Steamboats.

UPON the completion of the Erie Canal, in 1825, the traffic of the Great Lakes began to revive and soon became endowed with a new and vigorous growth. The opening of the water highway, affording a continuous navigation from the Hudson River and New York clear through to the lakes and the then far West, had a marked effect on the inland commerce. The tide of immigration which, during the War of 1812 and for some years after, had followed the Ohio and Mississippi valleys, now turned toward the Inland Seas, and the shipping thereon floated deep upon the wave of prosperity. Along the shores of Lake Ontario the commercial activity and the increasing population soon changed the struggling hamlets into permanent settlements, and sailing vessels multiplied. The lack of safe harbors and the means of easy communication with the interior of the bordering States rendered progress less rapid on Lake Erie and the upper lakes. Above Detroit, until well into the thirties, the commerce was confined almost entirely to the fur trade and the supplies for the military posts and the few mission settlements in the north country.

The Erie Canal, the construction of which had long been advocated by such public men as George Washington, Gouverneur Morris, Cadwallader Colden, Christopher Colles, Philip Schuyler, George Clinton, Stephen

Van Rensselaer, Robert Fulton, and others, was begun on July 4, 1817. The profession of engineering had not then been established in America, and mechanical excavators had not been invented, but with only the wheelbarrow and shovel, and such simple and primitive devices, the early canal-builders dug practically all the original waterway. In only eight years it was completed, a wonderful achievement for those times, considering the financial difficulties and the physical problems incident to the digging of a canal through almost unbroken forests and along uncontrollable rivers for nearly four hundred miles into the heart of the lake region. The waters of the Inland Seas flowing through the artificial waterway, although in a broader and deeper channel, to the ocean, still constitute a monument to the progressive spirit and perseverance of the people of the time.

The canal as originally dug was forty feet wide on the surface, twenty-eight feet on the bottom, and had a depth of four feet, accommodating boats of eighty to one hundred tons' burden. Its builders adopted the European practice of the time and, so far as possible, avoided the rivers and lakes, although in some sections, as along the Mohawk River, the canal followed the river valleys from ten to thirty feet above the streams. This plan maintained nearly uniform levels, quite independent of freshets difficult of control.

The ceremonies of opening the "Grand Erie," as it was then called, began at the western terminal at Buffalo and ended upon the waters of the Atlantic, off Sandy Hook. The people of the State of New York were much enthused over the successful outcome of the great undertaking, and the whole country was attracted to the possibilities of development of the Western settlements and of trade through its use. Even to this day they have not forgotten "that they have built the longest canal in the world, in the least time, with the least experience, for the least money, and to the greatest public benefit."

On the twenty-sixth of October, 1825, the gayly decorated flotilla of canal boats, laden with the products of the West, entered the canal at Buffalo, for the first journey from the Inland Seas to the Hudson. They had on board the Governor, Lieutenant-Governor, a committee from the New York common council, and the committees from Buffalo and other villages. There were also two kegs of Lake Erie water, a bear, two eagles, two fawns, several varieties of fresh-water fish, and two Indian boys. The embarkation was heralded throughout the length of the waterway by the firing of cannon stationed at intervals, each of which caught up the roaring message in turn and passed it on to the next. In one hour and thirty minutes the salute had reached New York, when it was turned back to Buffalo, and passed Lockport by the guns with which Perry had won his naval victory on Lake Erie, twelve years before.

The journey to New York was a continuous series of ovations. At Lockport, Rochester, Syracuse, and other villages along the route the main streets were decorated for the occasion, and the boats were greeted with the firing of guns and fireworks, and the distinguished passengers were entertained at banquets and balls. At Albany, an entire day was spent in the celebration, and the next morning the boats were taken in tow by steamboats for the last stretch of the long journey, down the historic Hudson. On the morning of the fourth of November, the fleet arrived at New York, and was joined by many decorated vessels, forming a naval pageant. Off Sandy Hook the fleet formed a circle, and Governor Clinton performed the ceremony of commingling the waters of the Great Lakes with the ocean, by pouring a keg of that of Lake Erie into the Atlantic.

On the way back to the city, this toast was given, standing:

"The memory of Robert Fulton, whose mighty genius has enabled us to commemorate this day in a style of unparalleled magnificence and grandeur."

The festivities at New York continued for three days, finally concluding with a grand ball on the night of the seventh of November. Upon returning to the West the visitors carried a keg of water from the ocean, which, upon arrival at Buffalo, was poured into Lake Erie, thus ending the formal ceremonies. In commemoration of the completion of the canal, medals of white metal, and of silver and gold, were struck and sent to all prominent and public men of the day. Thomas Jefferson, upon receiving the medal, replied:

"This great work will immortalize the present authorities of New York, will bless their decendants with wealth and prosperity, and prove to mankind the superior wisdom of employing the resources of industry in works of improvement."

The commerce of Lake Erie and the upper lakes, during the decade preceding the opening of the canal, was not of a volume to tax the shipping offered, which consisted of about forty sailing vessels of various rig, with an average of sixty tons each, and the two steamboats. The cargoes of the schooners, during the summer months, were made up largely of deck-loads of white oak staves and heading for flour barrels. This kind of shipment was termed "Ohio fur." To Buffalo from the Western ports the cargoes consisted of lumber and shingles, corn, fish, furs, and whiskey, while on the return the vessels carried many passengers, household goods, provisions, and articles of domestic need. Shipping records of the time show that the schooner *Detroit,* Captain Robinson, cleared from Cuyahoga with a full cargo, consisting of ninety-one barrels of flour, one hundred and one barrels of whiskey, sixty-three barrels of pork, fifty-one barrels of dried fruit, twenty-four barrels of cider, and sixteen barrels of beef.

The lake rates were very favorable to the shipping interests, as the cost of moving merchandise over the rough post roads through the wilderness was excessive, often

amounting to one hundred dollars a ton for three hundred miles' haul. In 1824 the cost had not been reduced below one hundred dollars a ton from Buffalo to New York, and twenty days were required in transit. The cost of hauling a barrel of salt over the Niagara portage was seventy-five cents, and ten dollars for a ton of goods. As the population increased and settlers cleared the land and brought it under cultivation, agricultural products were added to the eastbound shipments, but were always sent by the water route, the rates by wagon being prohibitive. Some of the smaller sailing vessels, about 1825, made occasional coasting voyages to the Michigan settlements along the Huron shore, bringing the early pioneers and their household effects. Not until 1837 was the Territory of Michigan admitted to Statehood in the Union.

As immigration crept slowly and steadily westward, the commerce of the lake country grew more complex and important; and, since the cost of travel and of hauling merchandise by the land routes was so much greater than by water, the traffic of the Great Lakes was much stimulated. The spirit of progress and enterprise had also the element of haste, and the slow-going sailing vessels were soon inadequate to the needs of the eager pioneers hurrying to the Western settlements. The demand for more steamboats, whose regular schedules when more or less strictly adhered to offered some hope of reasonably quick passages, resulted in a number being built for the Lake Erie and upper lake business. At the time of the opening of the Erie Canal there were but four steamboats on the lakes; but in that year, 1825, several more were added to the fleet. The steamboat *Chippewa,* of one hundred tons' burden, was put in service along the Erie shores, and the *Pioneer,* of one hundred and twenty-three tons, was built by Benjamin Winslow, at Black Rock. This steamer, which was ninety-eight feet in length, sixteen feet, nine inches beam, and a draft of eight feet, was

stranded at Grand River in the Fall of her first season. She was raised and repaired and ran for several years to the upper lakes, finally being wrecked near Chicago, in 1834. A steamer named the *Martha Ogden* was built in the Fall of 1824 at Sackett's Harbor, for service on Lake Ontario.

In 1826 the steamer *Niagara,* formerly a sailing vessel named the *Union,* was in service on the lower lake, but soon after capsized in the St. Lawrence River. She was recovered with much difficulty and rebuilt with thirty feet added amidships. Her engine was very powerful and she was able to make the trip from York (Toronto) to Prescott in less than four days. The elegance of her cabins and fittings made her a popular boat on the route. The steamer *Queenstown,* of three hundred and fifty tons, ran between Queenstown and Prescott, by way of York; and the *Caroline,* of seventy-five tons, ran from Prescott to the head of the Bay de Quinte. The steamer *Toronto* also ran on Lake Ontario for several years, but never profitably, according to old records. The canal boat *Troy,* of the Merchant's Line, was the first boat with cargo to pass through the Erie Canal from the ocean to the lakes.

The steamboat *Enterprise,* of two hundred and nineteen tons, and the *William Penn,* of two hundred and fifteen tons, were built at Cleveland and Erie and added to the fleet in 1826. Three years later the *William Peacock* was built by Asa Standart for the Lake Erie service. She was one hundred and two feet in length, nineteen feet, six inches beam, and seven feet, six inches depth. On September 16, 1829, a steam pipe burst in a gale, and fourteen passengers lost their lives. She had a short career, being wrecked near Erie in 1832. In 1830 the steamer *Sheldon Thompson* appeared, with three masts, the first of that rig on the lakes.

During these early days of steam navigation on the lakes, modern helps for the mariner were unknown.

A few scattered lighthouses with their whale-oil beacons were the only safeguards provided by the Government for the guidance of the fresh-water navigator. There were no bobbing buoys of bright crimson, whistling or ringing the warning of dangerous shoals, no lightships to mark treacherous reefs, nor range-lights to guide through artificial channels. There were no life-saving stations with crews to rescue the shipwrecked, no weather reports to warn the captain of approaching storms, and no marine reports. There were practically no guides for the mariners through the whirling eddies and swift currents of the connecting rivers. The sturdy navigator learned the lessons of caution and alertness, and acquired skill in piloting, through the rough and dangerous school of experience, which, as in many other occupations, often ended in "the survival of the fittest." It was from the ranks of these "survivals" that the skilled pilots were chosen to guide the early steamboats and the larger brigs and schooners through the unchartered highways of the fresh waters.

These sturdy mariners, with their blue uniforms and brass buttons, were conspicuous figures as, from some point of vantage, they directed the navigation of their vessels. They were looked upon as heroes and almost idolized by the travellers bent on pleasure or business; and those fortunate enough to secure passage on the most popular steamboats deemed themselves specially favored. Of these, the steamer *United States,* commanded by Captain Elias Trowbridge, was most favorably known from one end of the chain of lakes to the other. It was during the Summer of 1831 that the hull of the steamer was built at Ogdensburg, and in November was ready to launch. Upon the waters of Lake Ontario an American vessel of such dimensions had never plied. She was one hundred and forty-two feet in length, twenty-six feet beam, and fifty-five feet wide over the guards, with ten-foot depth of hull. The proportions afforded large cargo

space, while her cabins were roomy and comfortable; and, when well laden with heavy merchandise as was usually the case, she was steady in a seaway. Her engines were of the low-pressure type then in universal use, with cyclinders forty inches in diameter and eight feet stroke. The total cost exceeded fifty thousand dollars. Her first trip was made July 1, 1832, and she was known for many years as the largest steamer run by an American on Lake Ontario. The traffic along the lakes was then assuming considerable volume, and the larger steamboats proved very profitable, while every year bigger and faster vessels were added to the merchant marine to compete with the older ones. The fur trade of the upper lakes country had reached enormous proportions at this time, and in 1833–34, the aggregate business of the Hudson's Bay Company amounted in skins to 93,168 beaver, 694,092 muskrat, 1,069 badger, 7,451 bear, 491 ermine, 9,937 fox, 14,255 lynx, 64,490 sable, 25,100 polecat, 22,303 otter, 713 raccoon, 8,484 wolf, and 1,571 wolverine.

The first steamboat built at Detroit was the *Argo,* but not long after a fine specimen of the shipbuilder's art appeared to wrest the palm of popular favor from some of the others. This steamer was the *Michigan,* which was not only the largest vessel yet built on the lakes, but was far in advance of most steamers of the time. She was built and owned by Oliver Newberry, who for many years was identified with the shipping and was largely engaged in the commerce of the lakes. The *Michigan* was launched on the twenty-seventh of April, 1833, and was one hundred and fifty-six feet in length, twenty-nine feet beam, with an extreme width over the guards of fifty-three feet, and was of eleven feet depth of hull. Although her model by no means approached the lines of comeliness, her speed was quite equal to others of those days, and she was equipped with powerful low-pressure engines, placed exactly amidships on either side.

On her first trip, October 11, under the command of Captain Blake, a veteran of the lakes, the *Michigan* attracted much attention, and as she steamed down the Detroit River, and at every port at which she called, she was hailed as a remarkable craft — a leviathan of the Inland Seas. Because of her fine finish, splendid fixtures, and luxurious furnishings, which were superior to those of any other of the lakes fleet, and also because of her stanch hull, she became a favorite with the travelling public. The cabins were unusually large and airy, the gentlemen's cabin containing thirty berths abaft the engines, and six berths forward of the machinery. The wide space between the engines formed the main cabin or dining-saloon, and was richly panelled and carved, and decorated in gold and white enamel. The ladies' cabin was on the after deck and was elegantly furnished and contained sixteen berths, and the forward cabin contained forty-four berths; so the interesting descriptions in old yellow and time-stained records reveal.

But these innovations were not all the unique features of the *Michigan*. The motive power was an entire departure from the engineering practice of the time, and evidently the installation of two separate and distinct engines to drive the side paddle-wheels, was looked upon as a doubtful expedient, for the experiment was not again tried in any of the later steamboats. The engines were of the low-pressure walking-beam type of eighty horse-power each, and each was connected independently to its own shaft and paddle-wheel. The cylinders were forty inches in diameter, and seven feet, three inches stroke of piston; and the arrangement of the machinery afforded much cabin space and unusual cargo hold.

This divisional disposition of the machinery operated very well in calm weather and in smooth water when the steamer was running on an even keel. But in stormy weather, when in a rough sea the waves ran high, the rolling of the vessel plunged one paddle-wheel deep in

the water while the other was lifted wholly or partly out of it. Ordinarily, with both paddle-wheels hung on the same shaft, the rolling and pitching motion of the vessel had little effect on the engine. In the *Michigan,* however, while the wheel submerged and its separate engine labored with difficulty to keep in motion, the other, high in the air, was spinning around swiftly. When the latter wheel again plunged beneath the choppy waves, a great shiver ran through the vessel from stem to stern, and the jerking motion from side to side rendered navigation of the steamer both difficult and unpleasant.

Sometimes during the summer months, when severe storms and gales were unknown, the *Michigan* ran one or more pleasure excursions to more or less remote points on the lakes. One excursion was generally made along the Erie shores, to the historic Put-in-Bay, Sandusky, Cleveland, Erie, and on to Buffalo. Returning, the northern shore was followed, stopping at Grand River, Long Point, Point Pelee, and Amherstburg. The trip to the north country included calls at the forest settlements of Saginaw Bay and River and along the Huron shore to the far-famed Mackinac. Thence the popular route lay down the Michigan shore, stopping at the mouth of the stream where Father Marquette, overcome by a wearisome journey, breathed his last. Skirting the southern shore of the lake, the St. Joseph River, early explored by La Salle, who established a mission post, was visited, and then the settlement of Chicago. Continuing northward the natural harbor of refuge, upon whose shore lay the hamlet of Milwaukee, was an interesting point; and Green Bay, far to the north, offered a stopping place of historic moment. Standing on the shore of Washington Island and looking out over the expanse of fresh water, the travellers could easily imagine themselves in the place of the French explorer, as he saw the *Griffin* sail away to an unknown fate.

At the close of the navigation season of 1833, there

were eleven steamboats on the lakes, costing three hundred and sixty thousand dollars. During the summer they carried sixty-one thousand, four hundred and eighty-five passengers, and of these about forty-three thousand were taken from Buffalo westward. There were two trips clear through to Chicago, and one to Green Bay. The time seems slow to navigators of to-day, for one steamer left Buffalo on June 23, at nine in the evening, and returning from Chicago did not arrive at the eastern terminal until July 18, at ten at night. The other trip was made in slightly quicker time — in twenty-two days.

In 1834 the steamers *Commodore Perry* and *Joseph Jefferson* were built for the Lake Erie service, and soon after the *W. F. P. Taylor,* the *Daniel Webster,* the *General Porter,* the *Washington,* the *Pennsylvania,* and the *Milwaukee,* were added to the lakes fleet. The following year the shipyards were busy, and by 1836 the steamers *North America,* the *Charles Townsend,* the *Oliver Newberry,* the *Washington No. 2,* the *Barcelona,* and the *Wisconsin* appeared to claim their share of the ever increasing maritime commerce. That they secured it, too, is evident from the fact that the shipbuilding did not stop there, for within the next five years the shipping increased remarkably both in the number and size of the new vessels.

CHAPTER IX

THE RAPID GROWTH OF THE LAKES SHIPPING

Speculative Fever and Immigration — Steamer *Illinois* — Rates — Steamer *Great Western*, First Built with Upper Deck and Cabin — The *Chesapeake* — Earnings in 1841 — Types of Marine Engines — Cost of Operating Steamers — New Steamers by 1842 — Depression of Commerce — Cut in Rates — Keen Competition — Steamboat Combinations — Races — Steamer *Empire*, First of More than One Thousand Tonnage — Cargoes of Sailing Vessels about 1845.

THE development of the shipping on the Inland Seas during the first twenty-year period of steam navigation just about kept pace with the growth of commerce of the lake country. Although freight rates were high, the risks were proportionately great, and capital in any considerable amount was not easily enlisted in the hazardous project of shipbuilding. But in 1835 a spirit of land speculation swept the Eastern States, drawing many people of comfortable means to the new and unsettled country along the lakes, and to the wilderness beyond. These settlers naturally followed the waterways as the easiest mode of travel. They swarmed in the canal boats along the Erie, and almost swamped the small and slow-going sailing vessels westbound from Buffalo. The steamboats were heavily laden with the families and household effects of the hurrying pioneers. They were land hungry and eager for new territory to conquer, new adventures, and the almighty dollar.

Commerce along the chain of lower lakes increased rapidly, speculation in all commodities was rife, bank currency was plenty, and everybody was getting rich. In 1836 the lake traffic of passengers, provisions, and gen-

eral merchandise far exceeded the shipping offered, and resulted in a great wave of shipbuilding. In that year there were forty-five steamboats on the great American lakes, with an aggregate of nine thousand, one hundred and nineteen tons, and two hundred and seventeen brigs and schooners, with an aggregate of sixteen thousand, six hundred and forty-five tons. The first steamboat to arrive at Detroit in 1836 was the *United States* from Buffalo with seven hundred passengers. She entered port on May 23, thus opening navigation for the season. Nearly a hundred arrivals were recorded for that year, and it was a common report of the time that vessel owners earned from seventy to eighty per cent of the cost of their vessels.

The steamer *James Madison,* launched at Erie and placed in commission in the Spring of 1837, was of six hundred and thirty tons' burden, registering the largest cargo capacity and accommodation for passengers of any vessel yet constructed on the lakes. She plied to the upper lake settlements, and was a very popular steamboat, being commanded by Captain R. R. Bristol, and afterward for many years by Captain McFadden. The *Cleveland,* built at Huron, Ohio, came out in the same year, with Captain Asa E. Hart as commanding officer. She had a low-pressure engine of the prevailing beam type, and her boilers were placed on the guards with two smokestacks wide apart. This arrangement evidently was deemed unsafe, for after the steamboat had encountered several storms, the boilers were installed in the hull below decks, with the smokestacks rising from the central portion of the waist section.

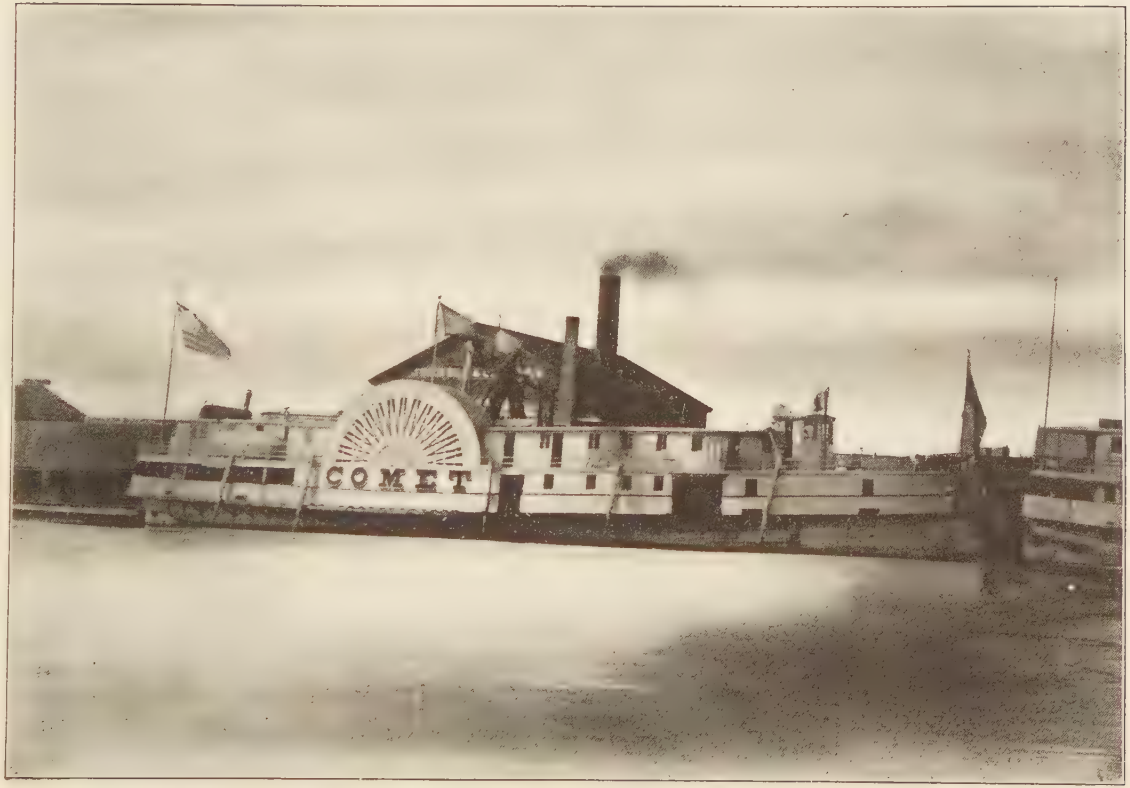
The steamer *Nile* was also put in service in 1837, and was propelled by a low-pressure beam engine which had been in the *Milwaukee.* The *Buffalo, New England, Constellation, Bunker Hill, Dewitt Clinton, Robert Fulton, General Wayne, Sandusky,* and *Rochester* were additions to the lake fleet at about that time. The *Caroline* and

the *General Macey* came from the Hudson River through the Erie Canal, augmenting the rapidly growing fleet of steamboats on the inland waterways.

During the Winter of 1837–38 the steamer *Illinois* was built at Detroit by Oliver Newberry for the Chicago trade, and under the command of Captain Blake proved very profitable. She was two hundred and five feet in length, twenty-nine feet beam, and thirteen feet depth of hold, and at the time was considered a leviathan of the lakes. The engine was of the low-pressure type, with cylinder fifty-six inches in diameter and ten feet stroke, capable of driving the vessel at a speed which took her from Buffalo to Chicago in five days, and the return trip in four days. This was a top-notch performance for lake steamers of the period. On account of her symmetry of outline, beauty of model, style of finish, and speed and seaworthiness, the *Illinois* was liberally patronized. In those days before the invention of the steam whistle, big alarm bells served the same purpose in a measure, and were generally placed high above the beam of the engine. In such a commanding position they sounded warnings of danger in fogs, as well as giving the code of signals used in navigation.

Although the reaction from the speculative fever set in at about this time, during which specie payments by the banks were suspended for a while, and the great volume of lake traffic was declining, shipbuilding went on apace. The freights stimulated such enterprises, and the largest steamboats earned large profits. The rate from Buffalo to Detroit for heavy goods was thirty-eight cents per one hundred pounds, and fifty cents for light merchandise. The down-lake rate on flour from Detroit to Buffalo was twenty-five cents to which was added a charge of five cents a barrel for elevator and warehouse dues at the eastern terminus. Grain took an eight-cent rate with an elevator charge of two cents a bushel. Beef, pork, whiskey, and some other commodities went at ten cents per one hundred

THE *PLANET*



THE *COMET*

pounds, with an additional three cents charge at Buffalo. Skins and furs were the same as flour, but six cents per one hundred pounds was taxed at the foot of the lakes. All westbound goods for the upper lake ports to go through before the close of the navigation season had to arrive at Buffalo by September 15, and for the ports of Lake Erie by October 15. The passenger rate for cabin passage from Buffalo to Cleveland was six dollars; from Buffalo to Detroit eight dollars; to Mackinac or through to Sault Ste. Marie twelve dollars; and to Chicago, Green Bay, or St. Joseph twenty dollars.

Immigration into Illinois and Wisconsin, however, had continued unabated, and in 1839 a regular line of eight steamers, varying in size from three hundred and fifty to six hundred and fifty tons' capacity, was formed to run between Buffalo and Chicago, making a round trip in sixteen days. This frequent and reliable service in turn stimulated the shipment of all kinds of merchandise by the through route instead of by the several shorter lines and the consequent reshipment with more or less delay, at Detroit. It resulted also in a revolution in construction of steam marine, whereby an upper cabin was added, and the lower or main deck cabin given over to the steerage and freight hold, thus greatly increasing the cargo capacity. The steamer *Great Western,* built at Huron, in the Winter of 1838–39, was the first to appear with an upper deck cabin, and it was such an innovation in marine architecture that many of the fresh-water salts expressed grave doubts as to the practicability and seaworthiness of the vessel. They said she was top-heavy and unsafe in a heavy gale, and that the rolling motion would be so unpleasant as to render her unpopular with the travelling public.

As a matter of fact, exactly the opposite conditions obtained, and the *Great Western,* which was one hundred and eighty-three feet in length over all, thirty-four feet, four inches beam, and thirteen feet depth of hold, was

the most popular steamer on the through route before the navigation season was ended. Although of less length of hull she was five feet greater of beam than the *Illinois,* and the tonnage, seven hundred and eighty-one, was the greatest of any craft then afloat on fresh water. The high-pressure engine was made in Pittsburg and hauled in sections overland to the lake. The cylinder was thirty inches in diameter with the usual stroke of ten feet, developing about three hundred horse-power. The paddle-wheels were twenty-seven feet in diameter and twelve feet wide. From one end to the other the hold was taken up with the boilers and engine and compartments for the wood fuel, and cargo space. On the main deck aft was the ladies' cabin with the dining-saloon adjoining, while the men's cabin, smoking-room, and bar were forward. There were sixty staterooms arranged on either side fitted with three berths each, or three hundred and sixty berths in all. Probably no three steamers contributed so largely to the settlement of Illinois and Wisconsin as the *James Madison,* the *Illinois,* and the *Great Western.*

When it was determined beyond a reasonable doubt from the performance of the *Great Western* during her first season, that the upper deck and cabin added steadiness in a seaway and greater safety, the owners of other steamers hastened to reconstruct the upper works of their craft, and add the upper cabin deck with a long salon offering a rich opportunity to the decorative artists of the time. Besides the large steamers before mentioned, those so equipped were: The *Niagara, Empire State, Saint Louis, Louisiana, Indiana, City of Buffalo, Wisconsin, General Harrison, Missouri,* and *Columbus.* The steamer *Erie,* built at Erie in 1838-39 for the Chicago line, was one hundred and seventy-six feet in length, twenty-seven feet beam, and ten feet depth of hold. She had a beam engine with cylinder fifty-two inches in diameter and ten feet stroke, which gave the vessel a speed of twelve miles an hour.

The *Chesapeake* was another very popular steamer on the Buffalo-Chicago route. She came out in 1840 and Captain Howe and her other officers probably catered to Southern patronage, for in 1842 her cabins were filled on each eastbound trip with citizens of New Orleans and Mississippi River towns bound for New York, by way of Chicago, the lakes, and the Erie Canal. It is related that night after night games of brag were the popular diversion, in which gold coins stood high in columns on the saloon tables. Wines and liquors flowed freely, and the suppers of prairie chicken were long remembered as one of the leading features of the service. The *Chesapeake* was distinguished from others of the "upper lakers," as the Buffalo-Chicago liners were called, by being the first steamer to have a single smokestack, all others up to that time having two stacks, one on each side. She met, however, a disastrous end for she was sunk in collision with a schooner off Conneaut, Ohio, on June 7, 1847.

In 1841 six of the largest steamers running on the through route and one to Green Bay for part of the season, earned three hundred and one thousand, eight hundred and three dollars. This was largely on agricultural products, three-quarters of which was on business originating at or west of Detroit. The steamer *Missouri,* of the famous Reed Line, which included the *Niagara, Louisiana, Queen City,* and the *Keystone State,* was a characteristic type after the style of the Hudson River steamboats, having the smokestacks set wide apart, one on each guard near the paddle-wheel boxes.

While the shipbuilders were striving to outdo themselves in turning out faster and more comfortable and even luxurious steamers, there was much experimenting in the engine department to produce the best type of propelling machinery. Some engineers regarded the rather cumbersome walking beam engine as the most efficient, and if all the truth be told, their liking for this type was

heightened perhaps by the lofty beam projecting above the upper cabin, for attached to this was often a galloping steed. The alternate rising and plunging forward of this figure was evidently intended to indicate to curious landsmen the speed of the vessel through the immense power of its mechanism. Others leaned to the " square-engine " which also projected in part above the cabin, but in place of the tumbling beam a vertical moving cross-head with swinging connecting rods on each side attached to cranks on the paddle-wheel shaft, served the same purpose, and revolved the big wheels. In motion the connecting rods were not unlike the crutches of a lame man, and seemingly designed for the same means of moving ahead. Still others favored the horizontal engine which, although it took considerable space on the lower deck, left the cabin above a long unbroken salon, adding to the comfort of the passengers and giving greater opportunity for the decorative effects. Some of the old lake travellers will recall the numerous panels of the stateroom sections, embellished with gayly painted marine scenes, ducal palaces of Rhine princes, or the rustic ruins of a woodsman's camp in the West.

The cost of operating a large steamer of this period (1840) when running on a regular schedule between ports at either end of the great chain of lakes, was about one hundred and fifty dollars a day. This amount included the wages of the officers and crew, the cost of wood, provisions, and ordinary contingencies. The fuel consumed by a steamer on a round trip through the length of the lakes was from one hundred to three hundred cords. It may be stated that a possible one hundred and fifty cords was a fair average, and the ruling price was about two dollars a cord. On this basis the twenty-four steamers on regular routes, using at least five thousand cords each during a navigation season, consumed one hundred and twenty thousand cords of wood, valued at about two hundred and fifty thousand dollars. The crew

of a large steamer numbered from twenty to thirty, and of a smaller one from eight to fifteen.

At the close of the navigation season of 1842, the fleet of lake steamers had been augmented by the following:

Waterloo	*Lexington*	*Ben Franklin*	*Little Erie*
Red Jacket	*Cincinnati*	*New York*	*Constitution*
Chautauqua	*Arrow*	*Boston*	*Albany*
Detroit	*Troy*	*Globe*	*Ohio*
Swan	*Southerner*	*Superior No. 2*	*Vermilion*
James Monroe	*General Scott*	*Julius D. Morton*	*Baltimore*
Baltic	*Fairport*	*Champion*	*G. P. Griffith*
Star	*New Orleans*	*Sultana*	*Saratoga*
		Tecumseh	

The great expansion in shipbuilding, which had done much for the industries of the lake country, finally was checked; and the freights which had made fortunes for many vessel owners were cut to unheard-of figures. This was due to the number of vessels constructed being of a far greater tonnage collectively than the increase of the business offered and the passenger traffic warranted. Sharp competition had set in and the passenger rate from Buffalo to Detroit was cut as low as four dollars with extras included. Although an association was formed of the larger vessel interests, the purpose of which was to regulate the number of vessels to remain in commission according to the needs of business between Buffalo, Detroit, and Chicago, and to retire from service all those not absolutely needed, and to fix rates accordingly, nothing of lasting benefit resulted, and the combination was short-lived. After this failure to regulate the commerce of the Great Lakes, conditions became worse than ever. Competing lines ran steamers alongside of their rivals' vessels, and at every port cut and slashed the prices right and left, in order to secure what business was offered. These practices reached such a pass that no profit could possibly be made by any one, and vessel owners were in

a fair way of losing a part of their earnings accumulated in former times of prosperity.

Most travellers were very willing to take advantage of the existing conditions, and the extremes to which the lake captains often went is illustrated by an incident told of Captain David Wilkeson, of the steamer *Commodore Perry:*

"A traveller approached him on the dock at Buffalo one day and asked what he would take him as a cabin passenger to Detroit for. The captain named an amount which was considerably less than one-half the regular rate, at the same time inviting him to step aboard to inspect the steamer and take a drink at the bar. The traveller could not be induced to take passage then, but a little while after this the captain met him again, and was told that a rival steamer would carry him to his destination for nothing.

"'Oh, well, if that 's the case I 'll carry you for nothing and board you. You will go with me, won't you?'

"'Well, I don't know,' was the answer, 'I think his wine is a little preferable to yours.'"

In 1843 there was another steamboat combination by which two lines operating between Buffalo and Detroit calling at way ports maintained a daily schedule, but on the through route from Buffalo to Chicago, the arrivals and departures at a given port were on alternate days. The rate of cabin passage between Buffalo and Toledo was fixed at six dollars; to Detroit seven dollars; and to Chicago fifteen dollars. The strong opposition, however, of the independent steamers soon resulted in a general slashing of rates and for a time the fare from Buffalo to Chicago was only five dollars. As late as 1845 the steamer *Julia Palmer,* commanded by Captain T. J. Titus, plied on Lake Erie in active competition with the *Constitution,* while the *James Monroe,* in turn, was detailed to run alongside the *Palmer* from port to port, carrying passengers and merchandise for almost nothing.

The keen competition of the lake steamers often reached a most exciting phase in the tests of speed which

naturally developed. For what captain would let a rival pass him if it were possible, by putting on more steam and pushing the engine to its utmost, to keep in the lead? On the other hand to pass the rival meant much for the faster steamer. She arrived in port in advance of the other and was in a position to pick up the best of the business offered, sometimes before the rival could get in to her dock. It also meant prestige in speed, and even in those days this was as much a factor in the successful operation of a steamer as it is to-day. The marine spectacle of the racing steamboats, sixty or seventy years ago, must have been a vivid one. With burgees and pennants, the Stars and Stripes and gay bunting flowing freely in the stiff breeze, they ploughed their way, recklessly it seemed, almost bow to bow through the open stretches of the lakes. The passengers lining the rails excitedly cheering and waving to those on the racer; the stacks belching dense clouds of smoke and red-hot cinders; the puffing and heavy laboring of the engines; the quick, sharp commands of the officers were sufficient to thrill even the frequent traveller accustomed to such scenes. Below decks the firemen piled in the wood and kept it stirred until the iron doors of the furnaces became red hot, and they were almost driven from their posts; the engineer watched the throbbing machinery with oil can in hand, eager to catch the first indication of hot journals or overheated parts, one eye on the steam gauge and engine levers. And withal the stanch hull creaked and groaned under the unusual and undue strain.

In 1845 the conditions surrounding the lake shipping had so improved that there were three lines extending daily service between Buffalo and Chicago, including way ports, and during the season carried ninety-three thousand, three hundred and sixty-seven through passengers, and five thousand, three hundred and sixty-nine between way ports. In all fully two hundred thousand persons crossed the lakes during the year, and at least fifty thou-

sand more travelled on Lake Ontario and the Welland Canal. At this time there was an entire lack of harbors along the eastern shore of Lake Michigan, and the entire business was distributed at Milwaukee, Racine, Southport, and Chicago, the regular ports. Michigan City, Ind., and St. Joseph, Mich., on the south shore of the lake, were the stopping places of only two or three steamers.

Shipbuilding had not been entirely suspended, for early in 1844 the keel of a mammoth steamer was laid in Jones' shipyard in Cleveland. It was named the *Empire,* and was the first steamer in the United States to measure more than one thousand tons. Its dimensions were two hundred and sixty-five feet length over all, thirty-six feet beam, sixty-two feet over the guards, and fifteen feet depth. The engine was of five hundred horse-power, and the paddle-wheels were thirty feet in diameter and twelve feet wide. The dining-cabin on the upper deck was two hundred and thirty feet long, with elegant staterooms arranged on either side, and the ladies' cabin was aft of the dining-cabin. The steamer was not only the largest yet built on fresh water, but was the most perfectly appointed of all. She was commanded by Captain Howe, formerly of the *Chesapeake.*

During this period in the development of the fresh-water craft, the sailing vessels also increased in numbers and size, and much of the romance of the Inland Seas is closely associated with the white-winged vessels. Although slow-going and uncertain, as all craft must be that depend upon the winds of heaven for their propelling power, they were generally profitable carriers, for to them was given over the shipment of all coarse, heavy commodities, such as grain, machinery, lumber, and much of the salt business. In one week there were shipped from Michigan City nine cargoes made up as follows:

Schooner *Huron*	Captain John Kline	4,746 bushels of wheat
" *Marengo*	" W. W. Allen	2,100 " " corn
Brig *Neptune*	" John Simms	2,500 barrels of flour
		700 bushels of oats

Brig	*Queen Charlotte*	Captain	C. Whittemore	1,420 bushels of wheat
Schooner	*Detroit*	"	R. Cochran	3,386 " " "
"	*Western Trader*	"	H. McHarry	750 " " oats
				175 barrels of pork
"	*Savannah*	"	Owens	3,400 bushels of corn
Brig	*John Kenzie*	"	John Thompson	3,800 " " "
				2,000 kits of bacon
				100 barrels of pork
Schooner	*Missouri*	"	Dunham	3,600 bushels of wheat

CHAPTER X

THE ADVENT OF THE SCREW PROPELLER — THE COMMERCE OF LAKE SUPERIOR

JOHN ERICSSON, THE INVENTOR OF SCREW MECHANISM — THE *Vandalia*, FIRST PROPELLER — THE *Hercules* — ECONOMY OF OPERATION AS COMPARED WITH SIDE-WHEEL TYPE — OTHER PROPELLERS — THE STEAM WHISTLE — FIRST SAILING VESSELS ON LAKE SUPERIOR — THEIR COMMERCE — THE *John Jacob Astor* — DISCOVERY OF STANARD'S ROCK — THE *Independence*, FIRST STEAMER ON LAKE SUPERIOR — THE *Julia Palmer*, SIDE-WHEEL STEAMER — COPPER DISCOVERIES — OTHER STEAMERS.

LIKE all great inventions which have aided in the uplift of civilized races, the development of the steam engine, or rather its refinement along lines of economical operation and high efficiency, has been slow, and even in this century the improvement goes on apace. To James Watt and his associates is the world indebted for the first practical steam engine; to Robert Fulton is credit given for the first successful application of its power to boat propulsion; but to still another famous engineer is all honor due for bringing into use the principle of submerged wheels. By this means steam navigation on the high seas was advanced from an experimental stage of side paddle-wheels to a fixed and permanent place in the commercial arts. To-day the screw propeller is the universal type of vessel both for deep-sea and lake navigation, while the use of the side-wheels is confined entirely to the lakes and rivers.

Posterity in all fairness has agreed to name John Ericsson, the renowned engineer of Sweden and America, as the father and projector of the screw type mechanism, and the general arrangement of the engine for the applica-

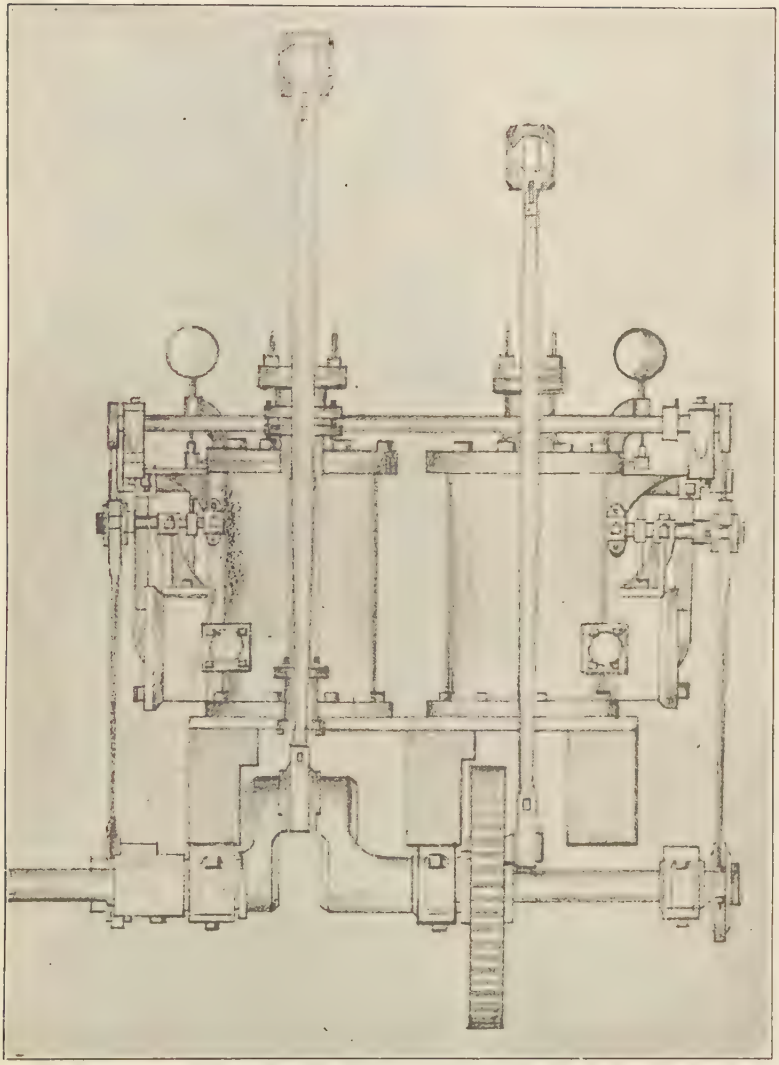
tion of the power to it. As in the case of the first successful steamboat of Fulton's, the solution of the problem of the submerged screw did not come about at once after the early experiments, or, in fact, in several decades. Patents had been granted in America to other inventors as early as 1791, and a steam propeller had been tried on the Hudson, from 1802 to 1806, by John Stevens, but not until thirty years after did the improved appliances prove a commercial success. Ericsson, who had been occupied for several years in improving the steam engine, turned his attention, in 1836, to steam propulsion of vessels, and associated with him was Francis B. Ogden, then United States consul at Liverpool.

After much thought and study of the problem Ericsson made a model of a steam vessel which he thought entirely practical, and tested it in a public bath in Liverpool before an assemblage of engineers and public men. So simple and easy running was the mechanism that a boat forty feet long was built and launched in the Thames. It was propelled by a double screw, and the engine was of an improved type for the time, giving the little boat a speed of ten miles an hour. Behind it in the official test was towed the barge of state with the Lords of the Admiralty, who were interested spectators; but when asked to adopt the principle of the screw propeller in the British navy, they refused. The reason given was that they believed a large vessel of the line of battleship could not be steered when power was applied so near the stern. The same disbelief in the practicability of new inventions has, in all times and ages, retarded the advance of mechanical science.

However, a friend of Ericsson's, Robert F. Stockton, a United States naval officer, believed in the new principle of the application of power, and ordered a small propeller built which he named after the inventor, and sent it across the Atlantic under sail. Ericsson followed in 1839, and spent several years in further experiment and

efforts to interest the Government in his invention. He finally succeeded in 1844 when the steam frigate *Princeton* was built with submerged wheels, — the successful precursor of the world-famed battle fleets of the nation. During these years, nevertheless, Ericsson's screw-propeller principle had been applied to as many as forty-one vessels of the merchant marine plying on the Great Lakes and the coast.

The first screw propeller on the lakes, as also the first steamboat, nearly twenty-five years before, plied on Lake Ontario. She was the *Vandalia,* of one hundred and thirty-eight tons, built in the Winter of 1840–41 at Oswego, and the first trip to the head of the lake was made November, 1841. Sloop-rigged with a cabin on deck fitted comfortably for passengers, the little steam propeller attracted much attention, for in comparison with the cumbersome type of the side-wheelers with their high walking-beam rising and plunging forward, she seemed to be all deck and cabin, with no machinery, for there was none of the latter in sight. Only a small stack near the stern indicated that she had any power other than the sails which were used when running with favorable winds. In the Spring of 1842, under the command of Captain Rufus Hawkins, the *Vandalia* passed through the Welland Canal to Buffalo, where she awakened great interest among the mariners of the upper lakes. The total weight of her machinery was only fifteen tons, and ten cords of seasoned wood were sufficient for a day's run. Several years later the trim little propeller was enlarged to three hundred and twenty tons' burden, and the name changed to *Milwaukee.* The *Oswego,* the second vessel of this type, and of one hundred and fifty tons, was built in 1842 for service on Lake Ontario. On the Canadian side of Lake Ontario a propeller named the *Ontario* was the first vessel of that class to ply between Toronto and Quebec. She was of one hundred and fifty-eight tons and surprised the oldest



SIMILE OF ORIGINAL DRAWING BY JOHN ERICSSON OF DOUBLE ENGINE FOR THE PROPELL
VANDALIA, THE FIRST SCREW-PROPELLED STEAMER ON THE LAKES, BUILT IN 1841

(Drawing in possession of Mr. Frank E. Kirby, of Detroit)

THE *NORTH WEST*

mariners by making the trip between those ports in three days.

Of the popular misconceptions regarding the merchant marine upon the high seas, the idea that the twin-screw type of modern leviathans was evolved from the single-screw propeller, is a very natural though a mistaken one. For, as a matter of fact, the early propellers were all fitted with double screws on independent shafts, and the single-screw shaft protruding from the stern post at the keel line came some years after. One of the widely known propellers upon the upper lakes in those early days was the *Hercules,* built at Buffalo in 1843. She was of two hundred and seventy-three tons' burden and was equipped with two shafts, one on each side of and near the stern post. The paddles or blades were made of three-eighths inch boiler iron and were eighteen inches broad and thirty inches long, giving to the screw a diameter of slightly over six feet. The popular impression of this novel steamer is reflected in the terse account that appeared in an old print of the time:

"The building of the propeller *Hercules* is the commencement of a new era in steam navigation on the lakes, and her owners predict for that description of vessel a large share of the carrying trade, especially upon the upper lakes. The *Hercules* is one hundred and thirty-seven feet long, twenty-five feet beam, eight feet depth of hold, and put together in the strongest manner. She has fourteen staterooms, six feet square, and sufficient additional space for the erection of forty-six more berths, and from the peculiar symmetry of the *Hercules*, she will afford ample accommodation for families emigrating. Her space below for storage is large, having almost the entire hull of the vessel appropriated for that purpose. The peculiar feature of the *Hercules* is her engine and its auxiliaries. On examining the machinery all are struck with the infinite compactness of the steam apparatus and its perfect simplicity, the whole weighing but fifteen tons. The engine is simple and very small, lies close to the keelson and fills a space only six feet square. It is of the Ericsson patent, was made at Auburn, and is computed to be of fifty horse-power. From the superb manner in which the *Hercules* is built and fitted out,

having cost nearly twenty thousand dollars, it is apparent that the enterprising proprietors are determined to give the experiment a full and fair trial."

Ten cords of seasoned wood costing seventeen dollars were sufficient to supply ample steam for the twin engines of the high-pressure type, with cylinders fourteen inches in diameter and twenty-eight inches stroke. The economy of operation of the *Hercules* as compared with some of the largest side-wheelers is shown by the consumption by the latter of two cords of wood an hour at normal speed, or at a cost of eighty dollars a day. On one occasion in the down trip from Chicago to Buffalo, the *Hercules* amazed the marine world by covering the distance of more than nine hundred miles in six days, with a cargo of twelve hundred barrels of flour and sundry merchandise.

During the year 1843 the propellers *Racine, New York,* and *Chicago,* of one hundred and fifty tons each, were built at Oswego, and supplied with engines and machinery of the same type as the *Hercules.* These steamers plied for many years on Lake Ontario. In the same season the *Sampson* was built at Perrysburg, on the Maumee River, and was of two hundred and fifty tons; the *Emigrant* was built at Cleveland and measured two hundred and seventy-five tons; and in July the *Independence* was launched at Chicago, and was of two hundred and sixty-two tons' burden. Steamers of this tonnage were built one hundred and twelve feet in length, twenty-five feet beam, and nine to ten feet depth of hull. In the following year, 1844, a larger propeller was built at Buffalo and named the *General Porter,* registering three hundred and ten tons, but came to a disastrous end by being wrecked in 1847. The year 1845 witnessed still larger propellers, — the *Syracuse,* built at Oswego, the *Princeton,* at Perrysburg, and the *Phœnix,* at Cleveland, each of three hundred and fifty tons. Five years later at the middle of the century there had been built about

fifty screw propellers, measuring sixteen thousand, four hundred and twenty-seven tons, and at that time they were fast supplanting the side-wheelers, in the general carrying trade. Especially was this true in the transportation of coarse, heavy commodities such as grain, machinery, lumber, and salt, which left for the larger and more stately steamboats the elegant passenger traffic and the package shipments of general merchandise.

It was in 1850 that the propeller *California* was built with twin engines, the cylinders of which were eighteen inches in diameter with thirty-four inches stroke, and with eight-foot wheels; the *Globe,* also with twin engines with cylinders sixteen inches in diameter and twenty-eight inches stroke; and the *Goliath* and *Manhattan,* with about the same equipment of machinery. These steamers were about one hundred and forty feet in length, twenty-four feet beam, and ten feet depth of hold.

The invention of the steam whistle was an event of very lively interest to the vessel men of the lakes, for it was on a lake steamboat that the first whistle, a rather crude affair, was tried out. During the Winter of 1843–44 the steamboat *Rochester,* which was the last of the old-timers to be overhauled, was given an upper deck and cabin, and while the work was going on her chief engineer, William McGee, experimented with a whistle made from plans and descriptions he had seen in a foreign paper. As the whistle gave forth a most piercing screech, well calculated to startle the natives, it was attached to the *Rochester* more for novelty than for practical use. The steamboat left Buffalo for Chicago on her first trip of the season early in May, and when steaming northward on Lake Huron near Bois Blanc Light, she overhauled the propeller *General Porter,* Captain Charles L. Gager, between whom and engineer McGee there had long existed a bitter enmity.

As the *Rochester* approached almost in the wake of the slower propeller, the doughty engineer was ready with his whistle, and when close up to her he gave it vehement voice, ostensibly to "shoo-fly" the *General Porter* and her master. The defiant whistle continued to blow while the *Rochester* forged ahead of the propeller, much to the disgust and anger of the latter's captain. The side-wheeler hauled to at Mackinac, the regular stopping place at the head of the lakes, and in due time the *Porter* also arrived. Captain Gager, who was unaware of the fact that his arch enemy, McGee, was the offender, hastened to the landing place of the *Rochester,* and demanded in a loud voice the presence of the man who had so insultingly "squawked" at him. The engineer had expected such an outburst of righteous anger, and shouted "Here he is," at the same moment landing on the deck at a bound. Nothing but the intervention of bystanders prevented a serious encounter, as both men were stalwarts. McGee's steam whistle proved of great utility and it was at once adopted by steamboat owners, thus relegating the alarm bell. It was not long before steam whistles were in quite general use on factories and other establishments on land.

The commerce of Lake Superior was developed long after that of the lower lakes had become well established; and viewed in the order of the natural events, there are several logical reasons for it. Settlement of the north country had been retarded, for it was a cold and forbidding wilderness offering little inducement or promise to the early pioneers in a more temperate clime. Just as settlement of the country along the shores of Lake Huron and Lake Michigan had naturally waited for immigration from the East to first populate the villages along the shores of Lake Erie, so the then far north country waited for a considerable growth in population of the territory immediately south of it. Then, too, the falls of the St. Mary's River, which had been impassable to even

the birch-bark canoes of the early fur traders, presented an insuperable barrier to all navigation between Lake Superior and the lower lakes.

Prior to the War of 1812 there were but four or five small sloops and schooners upon the waters of Lake Superior, and there was very little traffic for them, aside from the occasional cargoes of furs which were collected by the British Northwestern Company, at a few posts along the southern shore. In 1812 another little sloop of forty tons, named the *Fur Trader*, was built, but, as the trade was declining, it was run down the St. Mary's River rapids and so seriously damaged by striking a hidden rock as to be abandoned as a wreck. The other sailing vessels, with little or no business offered, at different times accepted the hazard of shooting the rapids, and were more successful in this than had been the first craft to attempt it. For a time there was only one small vessel with sails upon the whole wide expanse of Lake Superior.

For a period of about twenty years following the termination of the war, the fur trade and the commerce of the upper lake was in a dormant state, and the bateau and the canoe of the Indians were the only craft upon its waters. In 1817 the brig *Wellington,* under the command of Captain Alex. McIntosh, towed a small vessel of thirty tons' burden, named the *Axmouth,* from Lake Erie to the Sault, where it was hauled out and over the portage on the Canadian side. It was the first vessel from the lower lakes to be launched into Lake Superior waters, and was delivered to the American Fur Company which the year before, under the control of John Jacob Astor, had succeeded to the business of the British Company. Five years later a schooner bearing the British ensign appeared, and under the command of Lieutenant Bayfield was engaged in making surveys and charts of the lake. This was the first work of the kind undertaken in these waters.

About 1834 the fur trade began to show signs of revival, and the American Fur Company ordered a large vessel for their upper lake business. Ramsay Crooks and Oliver Newberry, of Detroit, were commissioned to attend to the matter, and a schooner of one hundred and twelve tons was built. The frame timbers and planks of white oak were cut at Black River, Ohio, during the winter, and in April, 1835, they were shipped on board the schooner *Bridget* which arrived at the Sault about the first of May. The materials were then hauled over the portage, a distance of nearly a mile, to the upper waters, and the keel of the vessel was laid on the seventeenth of that month. It was the first sailing vessel to be built and launched by Americans on Lake Superior, and when given to its natural element, early in August, was named the *John Jacob Astor*. On the fifteenth of August, in command of Captain Charles C. Stanard, the *Astor* sailed up the lake on its first voyage, and on the twenty-sixth, the captain discovered the celebrated rock which has since excited so much curiosity, and has been so great a source of annoyance and anxiety to the navigators of Lake Superior. When first sighted the weather was thick and the lake rough, and it appeared to be a huge bateau capsized with the sea breaking over it. The following day its true character was determined, and its location marked on the crude charts of the time. It was such a menace to navigation near the entrance to Keweenaw Bay, that some years after the Government established a beacon light on the spot, and it has ever since been known as Stanard's Rock Light.

The *Astor* sailed the lake for several years but was wrecked on the rocky shores in 1884. On September 21, it lay at anchor in Copper Harbor, when a violent gale sprang up, the cable parted, and the craft was driven helplessly ashore, striking on a low conglomerate cliff. No lives were lost and most of the cargo was saved. In 1837 the American Fur Company had

built a small vessel named the *Madaline,* sailed by Captain Angus, which was engaged chiefly in the fishing trade. A year later the schooner *William Brewster,* of seventy-three tons, was built of timbers and plank brought up the lakes from Ohio, and was commanded by Captain John Wood. In 1842, however, it was sent down the St. Mary's rapids to join the lower lakes fleet which was engaged in a more profitable trade.

Steam navigation on Lake Superior was inaugurated by a propeller, and ever since that event this type of vessel has seemed better adapted than any other to navigate its troubled waters. The discovery of copper in the years 1843 and 1844 greatly increased the prospective richness of the Lake Superior country, and the vicinity of Copper Harbor on Keweenaw Point became the Mecca of fortune hunters. As a result immigration at last turned toward the north, commerce increased rapidly; and naturally the vessel men were the first to feel its effects and gauge its prospects. In the Autumn of 1844 the propeller *Independence* was taken to the Sault, and, when the winter had set in, it was hauled out of the river and made ready for an overland voyage to the higher level of the upper lake. Aided by a heavy fall of snow which was packed down along the road, several yoke of oxen tugged and dragged the hull over the mile course, and left it in an advantageous position for launching in the spring.

The winter ice in this latitude does not break up and drift out of the harbors and lake until late in the spring, and with repairs to be made on the *Independence*, it was well along in the summer when it finally steamed from Sault Ste. Marie, under the command of Captain J. M. Averill. The best speed under steam alone was not much more than five miles an hour, but this was sometimes accelerated by the use of the foresail and mainsail when the wind was favorable. Steaming up the lake the first port touched was Copper Harbor, or Fort

Wilkins, where there was a small garrison and a few huts of fishermen and early prospectors. Continuing the voyage the first propeller on the upper lake discharged the cargo at Eagle River, early in the Fall of 1845. Eagle Harbor, Ontonagon, Marquette, L'Anse, and Superior were the only other settlements then on the lake. Landings had to be made in small boats, as navigation close to the rocky shores was always dangerous, and no reliable charts existed. The only beacon lights were at White Fish Point and on Manitou Island.

The first steamboat (side-wheeler) to be hauled around the rapids for service on Lake Superior was the *Julia Palmer,* and the first trip of the old vessel was made in the Spring of 1846. The schooner *Napoleon* was taken over at about the same time and afterward equipped with steam power applied to a screw mechanism. The following year the steamer *Baltimore*, of five hundred tons' burden, was hauled across the portage; and soon after the propellers *Manhattan, Peninsula, Monticello,* the side-wheeler *Sam Ward,* and the schooner *George W. Ford,* augmented the upper lake fleet. By 1850 the merchant marine had been increased by the schooners *Algonquin*, *Swallow*, and *Merchant*, of about seventy tons; the *Chippewa, Siskowit,* and *Uncle Tom,* of forty tons; and the *White Fish* of fifty tons, owned by the Hudson's Bay Company. The *Merchant* was lost in a gale in 1847, with several passengers and her crew.

At about the time that the copper discoveries on Keweenaw Point aroused the whole country to the possibilities of wealth and permanent settlements in the then Northwest, there was no regular line of steamboats or propellers running between Detroit and Sault Ste. Marie. But in 1845 Captain E. B. Ward, one of the prominent vessel owners on the lakes, placed the side-wheeler *Detroit* on the route between the Sault portage and the lower lake ports, making regular weekly trips. In the Spring of 1846 the steamer *Ben Franklin* was added to

the route, and ran steadily until 1850 in which year it was wrecked on Thunder Bay. At intervals, to meet the growing commerce created by the valuable copper finds, other steamers were operated, of which the most popular were the *Northerner, London, Tecumseh, Albany, Illinois, E. K. Collins, North Star,* and *Goliath.* On the Canadian route, from Owen Sound ports to the Sault, the small steamers *Gore* and *Plow Boy* took the immigration coming through Canada.

CHAPTER XI

PROSPEROUS TIMES FOR THE LAKE MARINE

Divisions of Lake Commerce — Vessels in Service, 1846 — Advance in Steam Engineering — Rates — The Steamboat *May Flower* — The *Atlantic* — Its Loss — Account of Eye-Witness — Great Tide of Immigration into Michigan and Wisconsin — Vessels in 1850 — Chicago-Ogdensburg Line — Influence of Erie Canal and Other Canals on Lake Commerce — Trend in Shipbuilding — New Leviathans, 1850–1853 — Disastrous Competition.

FOR a clear and comprehensive survey of the development in the shipping on the Inland Seas, the history of the traffic and, in fact, the commerce of the whole lake region, may be divided into two periods. The one beginning with the Indian trade in the birch-bark canoe, continuing through the transition from the bateau and Mackinac boat to the white-winged schooners and steamboats of greater tonnage and speed, properly ends with the commencement of railroad competition, in the early fifties. The other period, in which the competitive influence of several trunk lines of the iron trail was felt by the shipping, begins with the completion of the Great Western Railway to the Detroit River, and extends to the present time. The narrative of the upper lake country may have a further division, before and after the opening of the St. Mary's ship canal and locks, in 1855, which event was the real beginning of the development of the upper-interlake waterway traffic.

The history of the first period embraces the discovery, exploitation, settlement, and early development of the vast territory known as the Middle West, and may fittingly be concluded within the limits of the present

chapter. The vessels of the merchant marine covered a wide range in size, form, construction, and method of propulsion, but for every one of them wood was the common material. In the second period the great increase in the internal commerce of the nation and traffic from the West to foreign shores, necessitated the building of many and larger steamers to carry it.

The limit as to size of wooden ships was finally reached in dimensions about three hundred and fifty feet length, and forty-six feet beam, and, as the demand for still larger vessels continued, principally for reasons of economy of operation, shipbuilders substituted iron in the construction of the hulls. The possibilities of iron ships of greatly increased tonnage were quickly realized, and soon led to a revolution in shipbuilding, from which emerged the era of steel ships. These are perfectly adapted to every requirement of the lake marine; and as commerce expanded the ships increased in tonnage, largely replacing the old wooden hulls in almost every division of the traffic. The great express steamers of to-day in the passenger service, the modern package freighters comprising scores of lines, and the giant ore-carriers — the twentieth century leviathans — are the most remarkable feature of America's waterways. These excellent examples of the marine architect's greatest skill, and incidentally the commerce of modern times, will be the subjects of the following chapters.

The number of vessels in the merchant service in 1846 was not much, if any, greater than in 1841, but the aggregate tonnage had increased to an appreciable extent. This was due to the fact that the vessels which had been wrecked, sunk, burned, or by reason of age or structural weakness consigned to a marine graveyard, were of much smaller size and tonnage than the fine large steamboats, the beamy propellers, and the stanch schooners which were built during those years. Prior to 1835 the largest vessels built were from three hundred to three hundred

and fifty tons' burden, while by far the greater proportion were from thirty to one hundred and fifty tons. Ten years later the dimensions of new steamboats had increased the tonnage to seven hundred or eight hundred, and their accommodations for passengers, especially immigrants in the steerage, were enormous.

There were in commission along the whole chain of lakes, in 1846, sixty-seven steamboats, twenty-six propellers, three hundred and forty schooners, sixty-four brigs, and three barks. The largest of the sailing vessels were of about three hundred and fifty tons, and some were old steamboats converted into schooners. Their routes lay from any and all ports through the length of the lakes, like the tramp ships of to-day; and their cargoes consisted principally of coal, lumber, wood, and stone. The smaller craft were engaged in business of a local character, carrying produce, wood, general merchandise, and salt. The total tonnage of vessels that year was 106,836, of which 60,825 was steam tonnage and 46,011 under sail. The total merchandise transported was 3,861,098 tons, and the passengers numbered about two hundred and fifty thousand. There were nearly seven thousand mariners engaged in the hazardous navigation of the lakes; and the steam vessels earned on an average three thousand dollars for the season. The British tonnage at this time was about thirty thousand.

While the shipbuilders of the time were turning out larger and finer steamboats and more capacious propellers, the mechanical art of steam engineering kept pace with the new requirements. As each new leviathan of the day came out it was equipped with improved engines of increased power, and, in some instances, of greater efficiency and economy of operation. The first compound engine built for a lake steamboat was placed in the *Oregon,* a clipper ship of 1846, which was two hundred feet in length, twenty-eight feet beam, and six feet draft. The engine cylinders were twenty-four and forty-eight

inches in diameter and nine-feet stroke, giving the steamboat a speed which won for it a large patronage. During the season the passenger rate from Buffalo to Detroit was six dollars, and the keen competition often resulted in tests of speed interesting and exciting alike to passengers and crew. It was a dangerous practice, however, as the long list of disasters on the lakes, due to boiler explosions, broken-down machinery, strained and leaking hulls directly attributable to this racing fever of the captains, and the consequent loss of life, mutely testifies. Travellers of those days were as eager to go on the fast steamboats, often regardless of personal safety, as are those of the twentieth century, who never think of the dangers of high speed on sea or land.

In 1847 a combination of vessel interests was formed to stop the abuses into which the lake traffic had drifted, and to fix stable rates. Cabin passage from Buffalo to Chicago was then ten dollars; to Detroit four dollars; and to Cleveland three dollars. Freights were also revised and fifty cents per one hundred pounds, and one dollar a barrel for bulky merchandise, produce, and meats became the established charge through the length of the lakes. The following year a new line was organized by the Michigan Central Railway to operate between Monroe, Mich., and Buffalo, and a vigorous effort made to divert a portion of the eastern business to their rail lines, stretching across the southern part of Michigan to Chicago. The steamboats *Southerner, Baltimore, DeWitt Clinton, Ben Franklin,* and *Julius* were operated on this route for two or three years.

The first steamboat built at Detroit for this rail-water line was the *May Flower,* which was completed for service on May 28, 1849. It was the largest vessel yet constructed and launched in the waters of the Great Lakes; it measured two hundred and eighty-two feet in length, thirty-five feet beam, and twelve feet depth of hull; and was of twelve hundred and forty-two tons' register.

There were three boilers of the largest size then known, and the engine of the beam type had a cylinder seventy-two inches in diameter by eleven feet stroke. The *May Flower* was elegantly fitted out and was regarded as the finest craft afloat. There were eighty-five staterooms with accommodations for three hundred cabin passengers, and provision was made in the steerage for three hundred and fifty immigrants. With all her power and speed this favorite steamboat had a short career. On December 16, 1851, it stranded near Erie, but no lives were lost. It was recovered the following Spring, repaired, and again took its place in the line. Two years later, however, it was wrecked on Point Pelee in a dense fog in November, 1854.

Contemporary with the *May Flower* was the famous steamer *Atlantic* which still lingers in the memory of the old mariners. It was noted for the unusual bursts of speed which often were kept up for hours, when its engine was pushed to its utmost power; and will not be forgotten because of its loss at sea in one of the greatest disasters in marine annals of the Great Lakes. The *Atlantic* was built at Newport, in 1849, and was eleven hundred and fifty tons' register, measuring two hundred and sixty-seven feet in length, thirty-three feet beam, and thirteen feet, four inches depth. In the first season, as a speed test, it ran from Buffalo to Detroit in sixteen and one-half hours, the quickest trip ever made up to that time.

The tragic ending of the *Atlantic* occurred on the dark night of the twentieth of August, 1852, when the propeller *Ogdensburg* rammed the side-wheeler in collision off Long Point, in Lake Erie. The *Atlantic* went down in deep water a few minutes later with a loss of one hundred and thirty-one lives, and a full cargo of general merchandise consigned to the West. The late account of an eye-witness of the disaster, a fireman on the ill-fated steamboat, graphically depicts the harrowing scene:

"It is all as clear to me as though it happened only yesterday. Every boat from the East in those days was packed with foreigners seeking a home in the Middle West. We left Buffalo about nine o'clock in the evening, and I was on watch. When about opposite Long Point the propeller *Ogdensburg* loomed out of the darkness without the slightest warning, striking the *Atlantic* well forward on the port side. The *Ogdensburg*, we learned afterward, was turning in to make the Welland Canal.

"We were struck fair and a great hole torn in the port side of the *Atlantic*, through which poured a terrific stream of water. The passengers were nearly all Danes and Swedes, great burly fellows armed with long knives which they knew how to handle. They could not talk any English, and it did n't do any good to try talking with them. They were the worst scared lot I ever saw. Men would fight among themselves for a chance to get into the life-boats. They were not content to get in themselves, but insisted on taking their bundles and big boxes with them. Women and children were trampled on as though they were of no account, and their cries, added to the shouts of the crazed foreigners, drowned the voices of the ship's officers. There was n't any use fighting with such a lot of human devils, so some of us got axes and knocked off cabin doors and everything else we could and showed the women how to hang on when the boat went down.

"Some of the life-boats launched were swamped as soon as they touched the water. Others got away safely with their loads and were picked up. While we were working the hardest trying to save the women and children, I felt a lurch, and the next instant the *Atlantic* went to the bottom, the water being filled with those who had been unable to get into the boats. How we were picked up and cared for is a matter of record, as is the number of those who were lost. But there are details of that night that have never been accurately depicted, and which I would gladly forget, if I could.

"At that I was fortunate, although losing everything, I had saved my life. A boyhood friend of mine from Toronto was on his way to Sarnia to visit relatives. I managed to secure passage for him on the *Atlantic*, and he was sleeping in my bunk when the collision came. He must have been killed, for the bow of the *Ogdensburg* ploughed through the room he was occupying, and I never saw him afterward."

Among the heavy losers by the disaster was an express company whose safe, well filled with currency and valuables, went down with the vessel. A thrilling scene at the

time of its recovery, almost four years later, was narrated in the issue of *Frank Leslie's Illustrated Newspaper,* for July 12, 1856:

"A submarine diver from Buffalo has at last succeeded in raising the safe of the American Express Company, which was lost when the steamer *Atlantic* was sunk off Long Point, in 1852. It will be recollected that this steamer was instantly sunk by a collision with a propeller, and that a large number of passengers were lost. The diver was protected by copper armor, and was under water forty minutes, during which time he had some strange adventures. The upper deck of the steamer lies one hundred and sixty feet under water, and far below where there is any current or motion. Everything, therefore, is exactly as it first went down. When the diver alighted upon the deck, he was saluted by a beautiful lady, whose clothing was well arranged, and her hair elegantly dressed. As he approached her, the motion of the water caused an oscillation of the head, as if gracefully bowing to him. She was standing erect, with one hand grasping the rigging. Around lay the bodies of several others as if sleeping. Children holding their friends by their hands, and mothers with their babies in their arms were there.

"In the cabin, the furniture was still untouched by decay, and to all appearance, had just been arranged by some careful and tasteful hand. In the office he found the safe, and was enabled to move it with ease, and took it upon deck, where the grappling irons were fastened on, and the prize brought safely to the light. Upon opening the safe it displayed its contents in a perfect state of preservation. There was in the safe five thousand dollars in gold, thirty-five hundred dollars in bills of the Government Stock Bank, and a large amount of bills of other banks, amounting in all to about thirty-six thousand dollars. Of course, all this money goes to the persons interested in this wonderful adventure."

It was about 1850 that the wave of prosperity, which for some years had been on the ascendant sweeping through the Great Lakes country, finally reached its height. At that time the population of Michigan had increased to 397,654, and Wisconsin to 305,391. All the inhabitants of these struggling States rich in natural resources, came by way of the lakes, and a large pro-

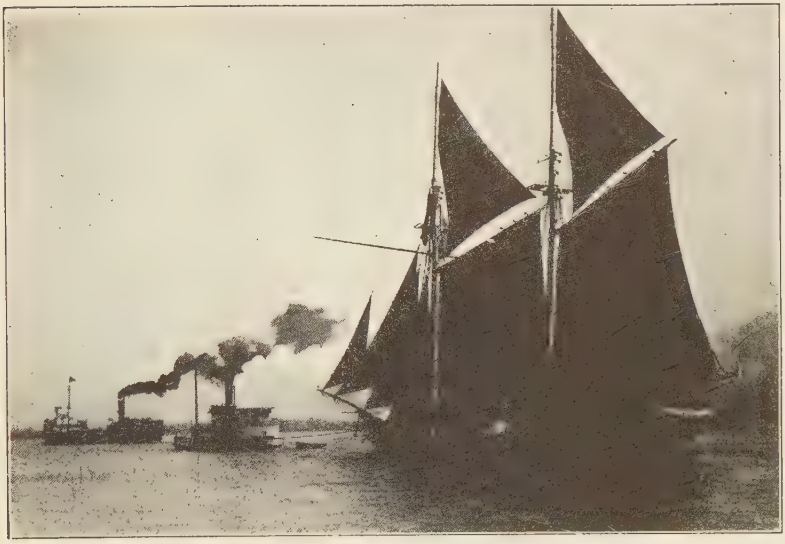
portion were thrifty foreigners. They did not straggle along by twos and threes but came in droves, and the steamboats on westbound trips were so closely packed with humanity that the crews could scarcely get about to attend to their work of navigation. Every steamer bound up the lakes carried from three hundred to five hundred cabin passengers and several hundred other immigrants in the steerage. Instances have been recorded where from thirteen to fifteen hundred people were unloaded from the largest steamboats, along the western shore of Lake Michigan, in a single trip.

In 1850 there were sixteen large first-class steamboats and twenty steam propellers, each of more than three hundred tons' register, engaged in the commerce between Buffalo and Chicago. Besides these there was an almost endless number of schooners and brigs, many of which could carry from ten thousand to fifteen thousand bushels of grain. The steamers alone plying between these ports maintained a service of arrivals and departures twice daily. They were elegantly fitted up, the cabins were large and luxurious, bands of music were carried, and the cuisine was equal to that of the best of the American hotels. The trip from one end of the route to the other generally was made by the fastest steamboats in about four days; the fare for cabin passage was ten dollars; and the profits were large. There was a north shore line of five propellers between Buffalo and Detroit; three steamers plied between Detroit and Dunkirk, the terminal of the Erie Railway to New York; three between Detroit and Cleveland; one between Detroit and Sandusky; two between Detroit and Toledo; one between Detroit and Chatham, Ontario; two between Detroit and Port Huron; one between Detroit and Saginaw; one between Buffalo and Green Bay; and four between Cleveland and Lake Superior ports. The port of Detroit in those days, as it is at present, was one of the most important distributing points on the lakes. The value of the imports

and exports at the principal ports of the Great Lakes exceeded eighty-one million dollars.

At the beginning of the second half of the century there were, on the entire chain of lakes, ninety-five steamboats, forty-five propellers, five barks, ninety-three brigs, five hundred and forty-eight schooners, and one hundred and twenty-eight sloops and scows, with an aggregate tonnage of 153,454. The largest and most popular steamboat built in 1850 was the *Buckeye State*, which was two hundred and eighty-two feet in length, thirty-two feet beam, and thirteen feet depth of hull. After the loss of the *Atlantic* the *Buckeye State* took its place on the line between Monroe and Buffalo, running with the *May Flower* and the *Ocean*. The following year the Northern Transportation Company was organized to operate a line of first-class propellers between Ogdensburg and Chicago, using the enlarged Welland Canal around the Niagara River from Lake Erie to Lake Ontario. In 1852 they operated the steamers *Ogdensburg, Boston, Prairie State, Michigan, Wisconsin, Vermont, New Hampshire, Cleveland, J. W. Brooks, Lady of the Lake,* and *Louisville.* These vessels were from two hundred and eighty to three hundred tons' burden, and for twenty-four years maintained this long and profitable route. A general reduction of rates, due to railroad competition, finally turned the former high earnings into a direct loss, and the line was abandoned.

In the two decades following the construction of the "Grand Erie," its feeders, and the lateral canals, as has been shown, lake traffic was wonderfully stimulated, and it came about largely by these means. An ever-increasing commerce originating far inland poured through the artificial waterways to various ports, and as the aggregate of the needful commodities largely exceeded the demands of local consumption, a great quantity found its way by the lake shipping to distant ports and beyond the waterways tributary to the lakes. The Erie Canal, which



"Rabbit" towing schooner on St. Clair River

The *R. N. Rice*

STEAMER *RAPIDS KING*, IN LACHINE RAPIDS

was completed upon the scale originally planned, in 1825, was the first in importance. After the first few years of its operation, in which practically all of its east-bound traffic originated at Buffalo, the commerce of the sections through which it passed for nearly four hundred miles, and in fact its terminal ports, expanded to a surprising degree. Three north and south canals connecting Lake Erie with the Ohio River were also great stimulating influences to broader trade, and the lake shipping naturally profited by it. Farm lands easily accessible to the canals were opened up, and produced increasing quantities of grain and produce which, by way of the canals and lake, reached the markets in the East. The Illinois and Michigan Canal to Chicago likewise added a considerable traffic for a number of years, and in this the through vessel lines profited.

The Erie Canal and its branches also contributed a large volume of commerce to Lake Superior and the Northwest. Just as the main current of immigration had gradually extended and broadened out along the distant shores of Lake Michigan and Lake Superior, so, too, the swift currents of freight traffic of a vast territory were drawn to the great water highway of the Great Lakes. Its magnetic tentacles of cheap transportation reached out in all directions and wherever a rich and productive section was tapped, bulky merchandise, coarse and raw materials, and farm products were drawn through the connecting waterways to the main channel, and hurried on to the markets of the country. Regions as far distant as Louisiana contributed large shipments of molasses, by reason of the rapidly increasing market of the North, which was due, in turn, by virtue of the transportation facilities afforded by the Great Lakes. Missouri, in 1845, shipped 47,170 pounds of lard oil to the lake trade; and Kentucky 610,415 pounds of hemp, which reached the lakes by the way of the Wabash and Erie Canal, at Toledo. In return for these and many

other commodities shipped to the northeast sections of the country, the manufacturing towns of Massachusetts and other Eastern States sent out to the lake region their manufactures and general articles of trade.

The trend in shipbuilding for a few years after 1850 was toward great expansion in size and speed of the steamers; and a notable advance was made in the decoration and embellishment of the cabins, staterooms, and general furnishings. They were finely modelled vessels, stanch and seaworthy, with broad cabins and decks, affording increased freedom to the passengers. Within the cabins and staterooms, they were veritable palaces, after ideas prevailing at the time, and they were everywhere greeted as the leviathans of the lakes. A feature was the extension of the joiner work on the forward main deck to the stem of the vessel, all the steamboats to that time having been open forward of a point about twenty or thirty feet from the wheel-boxes.

Among the first of these large steamboats the *Empire State, Northern Indiana,* and *Southern Michigan* were, perhaps, the best known and most patronized because of their excellent service. They were operated in connection with a competing line to the Michigan Central, extending westward, which some years after was absorbed in the Lake Shore system; and it secured a considerable share of the rapidly increasing business. The steamers were uniform in size, machinery, and general fittings, measuring three hundred feet in length, thirty-six feet, ten inches beam, and thirteen feet, seven inches depth of hull. They were equipped with powerful engines of the beam type, having cylinders seventy-two inches in diameter and twelve feet stroke, and were the largest yet built for lake steamers. The *Northern Indiana* met an untimely end a few seasons later, being burned, with a loss of fifty-six lives.

There were built at Buffalo, in 1853, for the Detroit route, the steamboat *Crescent City,* — three hundred

and twenty feet in length, thirty-nine feet, six inches beam, and fourteen feet depth, — and the *Queen of the West,* three hundred and twenty-four feet in length, forty feet beam, and fourteen feet, seven inches depth. These splendid steamers were a further step in size and tonnage, the engines having cylinders eighty inches in diameter by twelve feet stroke. The same year there came out from the Buffalo shipyard the steamboat *Mississippi,* registering eighteen hundred and twenty-nine tons, and a sister ship, the *St. Lawrence.* In size they were slightly larger than the other two, and their engine cylinders were of two inches larger bore, with the same stroke. They plied on Lake Erie between Buffalo and Sandusky, a route much in favor for passengers and merchandise to and from the interior of Ohio.

In 1853 Captain Harry Whitaker applied for a patent on a mechanical appliance for the direct application of the crank outside the hull to side-screw propellers. This was granted on October 18, 1853, and two years later the principle was first applied to the steamer *Baltic,* which was two hundred and twenty-one feet in length, thirty feet beam, and twelve feet depth of hull. In 1854 the steamboat *North Star* came out from the Cleveland shipyard, measuring two hundred and seventy-four feet in length, thirty-four feet beam, and eleven feet depth, and registering eleven hundred and six tons. After eight years of profitable service the *North Star* was burned in Cleveland in 1862. It will remain an interesting fact in the annals of the lake marine that this steamboat was the first to attain a recorded speed of sixteen miles an hour.

A daily line had been established in 1853 to operate between Chicago and Milwaukee, and soon after a steamer was put on the route from Chicago to Sault Ste. Marie. However profitable they may have proved, competing lines in strong opposition started up, and for a time the traffic on Lake Michigan was more than amply accommodated. It seemed to be the pervading spirit of the period

to let no line or combination of steamers enjoy a profitable business unmolested. Other vessel owners, envious of the prosperity of established lines, were sure to run their steamers in active competition, and in a short time, by cutting of rates, ruin the business for any or all of them. An equitable division and adjustment of routes and established rates of the old lines to-day results in much good to the shipping and the public at large; and seldom do outsiders, so to speak, break in to grasp a share of what is now regarded the rightful heritage of the many years' effort spent in building up patronage. When they do the result is nearly always disastrous to the invaders, and a considerable loss to the defenders.

CHAPTER XII

THE BEGINNING OF RAILROAD COMPETITION

Broadening of Commerce — Influence of Cheap Transportation on Prices of Food Stuffs to Consumer — Railroads become Strong Competitive Force — Trunk Lines Formed — The Michigan Central Liners — *Western World* and *Plymouth Rock* — Not Profitable — Sold and Dismantled — Decline of Lake Traffic — Opening of St. Mary's River Canal and Locks — Its Influence upon the Development of the North Country — Copper and Iron Deposits Opened — Vessels Leave Lakes for Coast and Foreign Trade.

CONSIDERED as a whole in the viewpoint of to-day, the commerce of the Inland Seas is mainly a growth of the last fifty years; and its beginning, as has been shown, may be traced to a definite series of events occurring in the decade preceding the Civil War. The trade of the country bordering on the lakes, and naturally that of the cities and towns which form its ports, has long ceased to be of a local character. The great natural highway of the lakes, and the artificial channels connecting them, belong no longer to the States whose shores are continually laved by their pure, clear waters. For eight months of the year its shipping carries a large proportion of the commerce of America, the aggregate of which is greater by far than that of any other waterway in the world. It exerts a vital influence in the industrial life of one great nation; and a growing and important influence in the expansion of the provinces to the north, and the development of the vast territory of the Northwest.

The Great Lakes have long since risen above the national lines of commerce, for they are giving cheap food

to populous Europe. The through water route from the head of the lakes to tide-water, offers a carrying rate on wheat and other grains so much less than is possible by an all-rail or part rail and water route, that the very needful commodities are laid down upon foreign shores at a cost which effects a large saving in the consumer's bill. They are making possible an industrial expansion of the most momentous character. They carry in their shipping the raw materials and deliver it at terminal ports by mechanical means at surprisingly small cost; they furnish the water power at several points, which is used in the processes of manufacture; and then they transport the finished product to large centres of population, or by way of the canals to the seaboard. From there the exports reach out to every country of the world, and the initial cheapness of lake transportation must have a bearing on the ultimate price of the article to the consumer.

Then, too, the Great Lakes offer to the tourist a never-ending panorama of uniform, clean, and beautiful shores, the water fronts of great cities, engineering works of great magnitude, beetling crags and pictured rocks with great caverns, and withal the most interesting marine to be found anywhere. It is all a most vivid reality; as one noted traveller has remarked, " In all the world there is no trip like this."

But it was not always so, for the development of any movement of such vast proportions, to be of a permanent nature and ever increasing by its very momentum, must by the nature of things spread over a goodly number of years. This development includes much of romance of the fresh-water seas in which the shipping — its rise and progress and its appeal to full-blooded Americans — is intimately interwoven. These features are of the utmost interest, and the human side of the inland navigation will be dwelt upon as the narration unfolds.

While the vessel owners of the lakes were actively engaged in fostering the inland waterway traffic, and the

shipbuilders were turning out larger and more magnificent steamboats and more capacious propellers to meet the demands of the growing commerce, other interests were at work to thwart these ambitious plans of monopoly. The competitive influence of the iron trail was not felt by lake shipping while the short and disconnected lines were being extended inland from the lake ports. In fact, the the first effects of railway building were highly beneficial to the waterway traffic, as the railway developed the unsettled counties beyond the lake frontier, and naturally fed the lake tonnage. The first locomotive to cross the prairies of western Illinois was brought to Chicago from the East by a sailing vessel. This was in 1837, and from that port the rail lines extended their conquest west and south through fertile lands. Railway construction brought additional traffic to the lakes in the transportation of iron rails, supplies, and the equipment of locomotives and cars.

But once having started there was no cessation in the advance of the railroad, and there came a time when the maze of the iron rail encroached on the well established traffic of the lakes and sought to share in the east and west bound trade. It paralleled the canals and branches, and early in the fifties the lakes themselves were bound together, so that locomotives of the prevailing type with the huge balloon stacks, ran from the shores of Lake Ontario and Lake Erie through to the shores of Lake Michigan. It even then had begun to gridiron the whole inhabited land. The Great Lakes could no longer offer the only means of easy communication between the principal ports of the lower lakes and beyond to the East, and the shipping interests thereon reluctantly gave up a portion of the traffic.

The first entry of the railway into active competition with the lake shipping was marked by the completion of the line extending across the northern portion of Ohio, between Cleveland and Toledo. This took place in 1852

and established by its connection with the Lake Shore at Cleveland a through route with the New York Central to the Hudson and New York. Westward from Toledo it connected with the Southern Michigan and the Northern Indiana railways, thus forming a continuous line to Chicago. These separate and distinct railroads for many years have comprised the main line of the Lake Shore system, which is a part of the New York Central Lines. From the beginning these individual roads exerted a powerful influence on the east and west bound traffic. They parallel the waterways for a distance of one thousand miles; they traverse a rich and productive country; and they join with their six tracks the two cities of greatest commercial importance with other prosperous communities which originate in themselves a vast commerce.

The second blow to the prestige of the Great Lakes as a monopolistic highway was struck when the Great Western Railway of Canada completed its line to the Detroit River. For several years it had been building through the rich country of southwestern Ontario, and in 1854 it reached the boundary line between the two countries at Windsor, across the river from Detroit. It formed another competing line from Buffalo to Chicago, and it was not long before traffic arrangements were so perfected as to change the current of commerce from water to land. The passenger traffic was first affected because of the quicker time afforded by the railroads, and gradually heavy inroads were made in the shipment of produce of a perishable nature, and meats, for the same reason. When navigation closed the lake shipping lay idle for four months or more while the highways of the lakes were ice-bound, and the all-year rail routes strengthened their hold on the shippers by this handicap to the vessel owners. A third and quite important blow to the lake shipping was the almost entire cessation of immigration. Altogether these causes effected a diversion of a large

proportion of the commerce from the lakes to the railroads, and for some years the vessel interests suffered.

That the shippers realized the handicap of winter to their operations and appreciated the advantage thus given the railroads, is evident in the almost frantic efforts of the Lake Erie navigators to hold the passenger business between Detroit and Buffalo. In the Winter of 1852–53, when the competition of the lake shore railways was first felt, they maintained a line of stages through Ontario, by the way of Chatham, London, and Hamilton. The trip took three days and the fare was twelve dollars, including ferriage at both ends. The mails were carried by this route in separate conveyances. When the Great Western Railway was completed the stage route was, of course, abandoned. In 1855 the lake rates opened at eighteen cents a bushel on wheat from the upper lakes to Buffalo, but a little later fell to sixteen cents. The receipts of all grain, including flour as wheat, at Buffalo, by both water and rail that year, amounted to 24,472,278 bushels. As the carrying rate was gradually reduced the older and smaller sailing vessels gave way to the new and stanch brigs and schooners, whose white-wings everywhere dotted the lakes. For a like reason the larger steamboats of good speed, but costly of operation, gave up much of the package freight shipments, when time was not an important factor, to the slower propellers, which could be operated at much less expense. All told the large and splendid steamboats of this decade suffered far greater inroads in their established traffic, than any other type of vessel.

The Michigan Central Railroad, which, it will be remembered, operated a line of fast steamers between Monroe and Buffalo in connection with their rail route westward to Chicago, must have viewed the rising competition with misgivings; but, with the true spirit of the time, they were not to be outdone by their rivals for the established traffic. By 1853 they were face to face

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with three main competitive forces. The first was composed of the other lake lines which were more aggressive than ever; the second was the new and powerful lake shore lines of railroad; and the third was the approaching completion of the Great Western Railway through Canada. The railroad competition must have offered the greatest problem to combat, while the competition of their kind, so far as the water route was concerned, could in a degree be fought with their very weapons. This meant a heavy outlay of money and considerable risk, but they at once adopted a scheme of shipbuilding which was the marvel of the marine world.

In 1853 the largest steamer of the Michigan Central fleet, which has already been described, was in size and equipment much inferior to the late modern steamers of the rival line in the western trade. The new leviathans were of about forty feet greater length, and five feet more of beam than the *May Flower,* and they had several miles an hour greater speed. They were much more elegantly furnished and their excellent service and reliability rendered them the most popular steamers plying on Lake Erie. To win back the favor of the travelling public the railroad had built, during the Winter of 1853–54, two mammoth steamers of a size and magnificence which far surpassed the most extravagant ideas of vessel owners and mariners of the time. The sister ships were named the *Western World* and the *Plymouth Rock,* and it is entirely within the limits of fact to state that, for forty years after, no passenger steamers were built on the lakes or were operated on the water highways, which equalled these splendid ships in size or luxury of appointments. Not until the steamer *Christopher Columbus* appeared in 1893, was the palm, according to these specifications, wrested from them, or more properly, from the memory of them.

The steamer *Western World* was three hundred and forty-eight feet in length of deck, forty-two feet beam,

seventy-two feet width of deck, and fourteen feet depth of hull. The hull of white oak had the timbers braced and strengthened with iron, thus forming four water-tight compartments. The tonnage was two thousand and two, and the cost of the steamer complete was two hundred and fifty thousand dollars. The engine was of the prevailing beam type for side-wheelers, with cylinder eighty-one inches in diameter and of twelve-foot stroke, and developed one thousand, four hundred and fifty horse-power. In point of size the paddle-wheels were notable, being thirty-nine feet in diameter with eleven-foot buckets. The *Western World* and the *Plymouth Rock* operated this line for three seasons, during two of which they were supplemented by the *Mississippi*, which for some years had been running on the Buffalo-Sandusky route.

But with all their size, speed, and splendor, these steamers were too large and costly, and entailed too great an expense of operation to be profitable under the conditions of the traffic during these years. In 1857 they were put out of commission and never again did they figure in the commerce of the Great Lakes. For six or seven years they lay tied up along the Detroit River front, until in 1863 they were sold, towed to Buffalo and dismantled. Their engines were taken out and shipped in sections to New York, where new hulls were built for them, and they served many seasons in eastern waters. The cabins were taken out and the hulls, still new, were towed to lake ports and converted into drydocks. The hull of the *Western World* ended at Bay City where it was in use until 1877; the hull of the *Plymouth Rock* met a similar fate at Buffalo; while the *Mississippi's* hull held many a smaller steamer for repairs at Cleveland.

Despite the lessening traffic of the Great Lakes after 1855, two other large steamers were built in 1856 and 1857. One of these, the *Western Metropolis,* was three hundred and twenty-one feet in length, thirty-nine feet, ten inches beam, and fourteen feet depth, and was

equipped with the engines from the *Empire State*. The other was the *City of Buffalo*, which was three hundred and thirty-one feet in length, forty feet beam, and fifteen feet, eight inches depth of hull. The engine was the vertical beam type, with cylinders seventy-six inches in diameter and twelve-foot stroke.

In 1857 there were on the lakes one hundred and seven side-wheel steamboats, one hundred and thirty-five propellers, and one thousand and six sailing vessels of all classes. Among these in regular service were the first *Cleveland*, the *Traveler*, the *Michigan*, the *General Taylor*, the *Garden City*, the *Concord*, the *Iron City*, the *Planet*, the *Dubuque*, the *Comet*, the *City of Toledo*, the *Favorite*, the *Gazelle*, the *Queen of the Lake*, the *Sunbeam*, the *City of Cleveland*, and the *Northern Light*. Some of these steamers were in the Lake Superior service, plying from the lower lake ports and Chicago to the rich copper country of the great inland ocean.

The opening of the Sault Ste. Marie canal and locks to inter-lake traffic, affording an unbroken navigation from the Atlantic through the St. Lawrence River and the Great Lakes to the head of Lake Superior, was a relief to the declining and unpromising fortunes of the lake marine. By this new connecting waterway it was possible for the first time for a vessel nearly one hundred and forty feet in length, twenty-six feet beam, and nine feet draft, to pass from Montreal to Fort William, at the western end of the inland ocean. The largest vessels then afloat on the lakes, including the side-wheel leviathans of broad beam, could steam from Buffalo and through the Sault Canal to the Superior ports. The vessels from tide-water, however, were restricted to the size of the Welland and the St. Lawrence canals, of the dimensions stated. The modern commerce of the upper lakes may be said to date from this important event; the renewed prosperity of the lake shipping was due directly to it; and the development of the iron, copper, and silver

mines of the north country was made possible by the transportation facilities thus afforded.

The Sault Canal and locks, which from their opening have exerted so great an influence upon the commercial progress of a large territory, were built by the State of Michigan, 1853 to 1855; and the works were generally known as the "State Canal." The canal was five thousand, four hundred feet long, one hundred feet wide on the water surface, and thirteen feet deep. There were two tandem locks, each three hundred and fifty feet long, seventy feet wide, and with a lift of nine feet. They were opened to traffic on June 18, 1855, with the passage from the St. Mary's River to the upper level of Lake Superior, of the old side-wheel steamboat *Illinois*. The voyage of this vessel, which was much larger than any that had ever before ploughed the waves of the inland ocean, was one continuous series of ovations from the pioneers of the ports, who hitherto had known only the small sailing vessels and the occasional steamboat of small dimensions and slow speed.

Although the presence of copper deposits at numerous points along the shores of Lake Superior had been known to white men for nearly two hundred years, the metal was of little value in the arts during the time of the early explorations, and nothing was done to secure the ore for commercial purposes until about 1843. The savages inhabiting the north country collected and used large pieces of the nearly pure metal in making crude hatchets, arrow points, and knives. In the "Journal du voyage du Père Claude Allouez," in the Jesuit "Relacion" for 1666–67, are found these passages:

"There are often found beneath the water pieces of copper all formed and of a weight of ten to twenty pounds. I have seen them many times in the hands of the savages; and as they are superstitious, they keep them as so many divinities; or as presents to the gods beneath the water, who have given them as pledges of good fortune. On that account they keep the

pieces of copper enveloped among their most precious furniture. There are some who have preserved them for more than fifty years, and others who had them in their families from time immemorial, and cherish them as household gods.

"Up to the present time it is believed that these mines were found on only one or two of the islands; but since we have made a more careful inquiry, we have learned from the savages some secrets which they were unwilling to reveal.

"The first place where copper occurs in abundance after going above the Sault is on an island about forty or fifty leagues therefrom, near the north shore. The savages say it is a floating island, which is sometimes far off and sometimes near, according as the winds move it, driving it sometimes one way and sometimes another. They add that, a long time ago, four Indians accidentally went there, being lost in a fog, with which this island is almost always surrounded. Wishing to cook some food they made use of their usual method, taking stones which they picked up on the shore, heating them in a fire, and throwing them into a bark trough full of water, in order to make it boil, and by this operation to cook their meat. As they took up the stones they found that they were nearly all of them pure copper.

"But further toward the west, on the same north shore, is the island most famous for copper, called the 'Minong' — the good place (Isle Royal). This island is twenty-five leagues in length, it is seven leagues from the main land, and sixty from the head of the lake. Nearly all around the island, on the water's edge, pieces of copper are found mixed with pebbles, but especially on the south side where there are shores on which are to be seen several layers or beds of copper, one over the other, separated or divided by other beds of earth or rocks. In the water is seen copper sand, and one can take up in spoons grains of the metal big as an acorn, and others fine as sand. . . . Advancing to the lake and returning one day's journey by the south coast, there is seen on the edge of the water a rock of copper which weighs seven or eight hundred pounds, and is so hard that steel can hardly cut it; but when it is heated, it cuts as easily as lead."

The "Relacion" of 1670–71 contains the comment of Père Ablon.

"We would remark, by the way, that copper is found in all parts of this lake, for we have seen plates and masses of this metal which weigh each a hundred or two hundred pounds.

The great rock of copper, of seven hundred pounds, and which all the travellers saw near the head of the lake, besides the quantity of pieces which are found near the shore in various places, seem not to permit us to doubt that there are somewhere the parent mines which have not been discovered."

The actual exploitation of the rich copper mines of Lake Superior dates from the opening of the Sault Canal, and credit is generally given this important waterway for bringing about this result, and also for its influence in furthering the shipment of iron ore from the upper Michigan districts to lower lake ports.

Like the discovery of copper, the first knowledge of the existence of iron in the north country came through the Indians. In 1844 United States geologist Charles T. Jackson obtained from a trader at Sault Ste. Marie, a fine specimen of a peculiar iron ore, which he had received from an Indian chief. He also learned at the same time that this chief knew of a mountain mass of the substance somewhere between the head of Keweenaw Bay and the headwaters of the Menominee River. This great deposit was soon located and the Jackson Company was organized in June, 1845, to operate in the district. To P. M. Everett, one of the original incorporators, is due the credit of being the pioneer in the development of the hidden treasures of Jackson Mountain. The first opening was made in the Fall of 1846, after a forge had been erected on Cary River, about three miles east of Negaunee. The forge was put in operation early in 1847, and the first ore mined was there manufactured into "blooms." The first blooms were sold to E. B. Ward, a prominent vessel owner of the time, and from them was made the walking-beam for the steamboat *Ocean*.

Although these stimulating influences to trade brought about a gradual improvement in traffic conditions, and the greatly increased field of operations for the shipping, offered by the opening of Lake Superior to it, were hopeful signs of renewed activity, the aggregate tonnage was

still excessive, and other sources of business were sought at the eastern end. There was an outlet in passing vessels loaded with the products of the West through the canals to the ocean, and a trade of some consequence was thus obtained. It was not an untried experiment, however, for in 1843, the schooner *Dolphin* passed down the Ohio Canal from Cleveland to the Ohio River and thence by that stream and the Mississippi to New Orleans. She carried a cargo of whitefish, with which the lakes were bountifully stocked. The following year the brigantine *Pacific* took a cargo of flour and wheat from Toronto to Liverpool. In 1845 the United States revenue cutter, *George M. Bibb,* left the lakes for New Orleans; and in 1847 the cutter *Dallas* left for New York. The barge *Eureka,* of three hundred and fifty tons, sailed from Cleveland, in 1849, during the height of the excitement over the gold discoveries, for California. She arrived at her destination in safety with fifty-nine passengers and a full cargo of supplies; and was probably the first vessel to sail from an inland port to the Pacific.

The first steam vessel to leave the lakes for ocean navigation was the propeller *Ontario,* of four hundred tons, which sailed from Buffalo for San Francisco. From 1850 to 1856 a number of sailing vessels made profitable voyages from Canadian ports on Lake Ontario to Europe. The steamer *Dean Richmond* made the first direct clearance from Lake Michigan to Europe, sailing on July 19, 1857, and arriving at Liverpool on September 29. On July 22, 1857, the bark *C. J. Kershaw* left Detroit with a cargo of staves, reaching Liverpool on September 5. The *Madeira Pet* sailed from Detroit for Europe the same year. In 1858 fifteen vessels with cargoes of lumber, staves, wheat and other grains, left the lakes for England; and in 1859, sixteen vessels entered the foreign trade.

In 1860 the general conditions were no more encouraging, and, thirty-nine vessels passed down the St. Lawrence

River to the seacoast. That year the number of side-wheelers in commission was small compared with those running in 1850, while the number of screw propellers steadily increased. This type of steamer was largely responsible for the retirement of the more stately steamboats of greater speed, and the smaller sailing vessels. With the close of the Civil War the commerce of the Great Lakes became greatly expanded by the return of industrial prosperity, and an increased tonnage was required.

CHAPTER XIII

THE UNITED STATES GUNBOAT *WOLVERINE*, THE FIRST IRON-HULLED VESSEL

EARLIEST USE OF IRON IN SHIPBUILDING — THE CONSTRUCTION OF THE GUNBOAT — DESCRIPTION — LAUNCH — FIRST CRUISE — THE MORMONS ON BEAVER ISLAND — ASSASSINATION OF KING STRANG — REBEL INVASION DURING THE CIVIL WAR — ITS FAILURE DUE TO THE GUNBOAT — THE FENIAN RAID AND CAPTURE OF INVADERS BY THE GUNBOAT — SERVICE IN RECENT YEARS — IMPROVED EQUIPMENT.

IN the naval register of the United States, from the early times even to the present, there appear the names of many vessels, from the converted yacht to the indomitable battleship, whose fame will always shed lustre upon the achievements of the navy. Some have been fought to victory in conflict with the world powers on the high seas; others have been lost in no less glorious defeat. Some have won renown in time of peace, while still others, by their very presence at opportune times, have preserved the peace of nations.

Among those which have been engaged in maintaining a strict neutrality is one little steamer with a history — a record for long and continuous service — that has no counterpart in the annals of the navy. The name, *Michigan*, belonging to a gunboat and registering fourth class among the warships of the nation, has been carried on the active list for more than sixty years. Since 1905 the name has been borne by a great modern battleship of the first class, commissioned in 1909. The gunboat, however, is still in service bearing the name *Wolverine*, symbolical of the State, and is doing patrol duty along the chain of Great Lakes.

The earliest use of iron in shipbuilding, either for the frame or sheathing, was in 1816, when Thomas Wilson, a Scotch boatbuilder, at Faskine, Lanarkshire, began the construction of an iron vessel. For attempting such an innovation in the well-established practice of centuries, he was jeered at continually by the simple and ignorant folk of the countryside, who would not believe that iron being heavier than water, when formed into a water-tight vessel, would float upon it. The first iron vessel, however, named the *Vulcan,* maintained a passenger service on the Monkland Canal for more than half a century, and was the pioneer of the iron and steel merchant marine.

The United States steamer *Michigan* was not only the first iron vessel launched in the fresh waters of the Inland Seas, but it is also the oldest iron-hulled ship afloat in the world. In her eventful career, far antedating any warship in commission to-day, and which included important service along the Canadian frontier during the Civil War, there has been witnessed a remarkable development in marine architecture. The wooden sailing vessels of stout oak frames and thick plank sheathing gave way to steamers of iron, and later that type in turn gave place to the modern steel leviathans of to-day.

It was on September 9, 1841, that Congress passed an act appropriating one hundred thousand dollars " for the construction and armament of such armed steamers or other vessels for the defence of the Northwestern States, as the President thinks proper, and as may be authorized by the existing stipulations between this and the British government." After the usual official delay and when extended correspondence had determined the status of an armed vessel on the lakes under the treaty rights of both nations, the plans for one wooden vessel, to be propelled by steam, were drawn. Before these plans were approved, however, it was decided to change, without official explanation, the structural material to

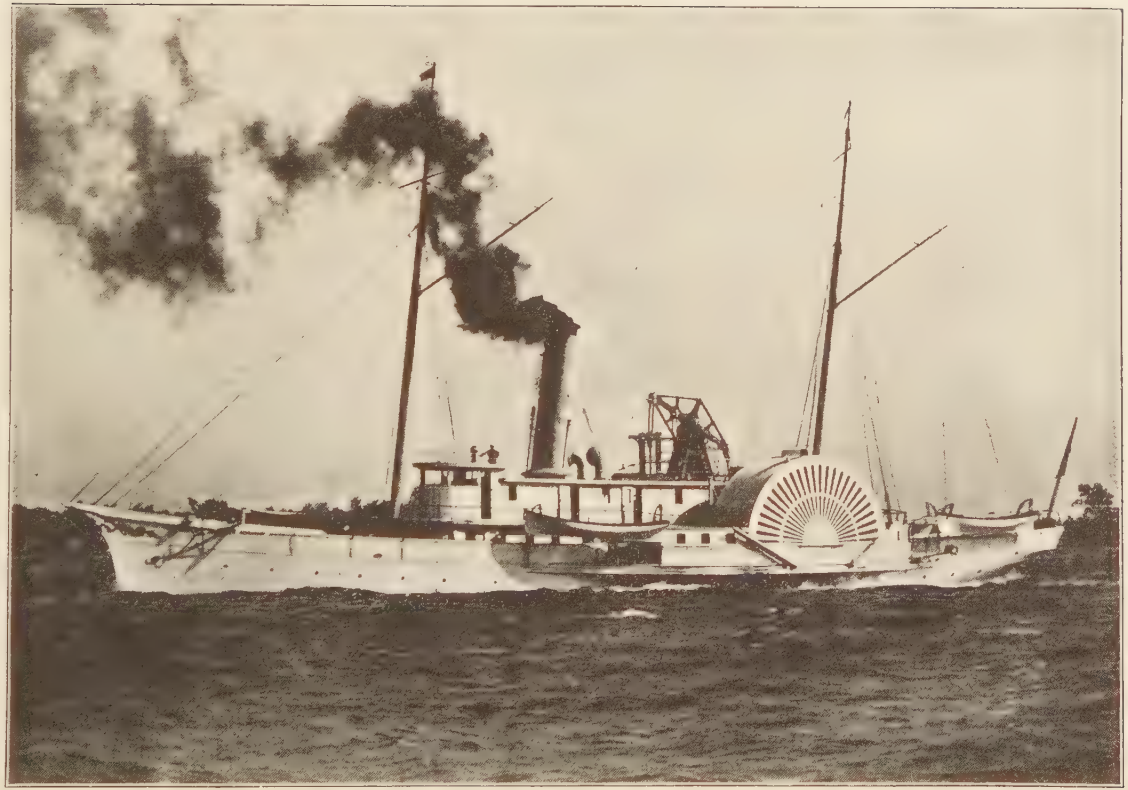
iron. With such delays it was late in the Spring of 1842 before the actual plans and specifications for the gunboat were prepared; but the contract for its construction was awarded in May to Stackhouse and Tomlinson, of Pittsburg. The Navy Department ordered Naval Constructor Samuel Hartt to the work as superintendent for the Government.

The templates were made, and the keel, ribs, and plates were rolled during that year in Pittsburg, and, with the other heavy metal parts and the machinery taken down in sections, they were hauled over the rough post roads through the almost unbroken wilderness to Erie, then a small settlement on the lake. Here, on the southern shore of the inland sea, Lake Erie, the vessel was put together, the engine and boilers installed, the wooden upper works and cabins built, and the rigging set. It was slow work at best with the few mechanical means at hand and at a place far removed from foundry and shop, but by early winter the trim iron vessel was completed, and was given the name *Michigan,* by President Tyler.

It was an eventful day to the mariners of the time, when, on the fifth of December, 1843, everything was ready for the launch. The occasion was not lacking in intense human interest and excitement to landsmen as well, since even in those days of enlightenment there were many persons who doubted the buoyancy of metal vessels, and predictions were broadcast that the iron steamer would not float when launched into the waters of the harbor. But when the last blocks which held her on the ways were knocked away, and she should have glided into her natural element, she stuck on the ways, and not until night did she launch herself — without the assemblage of spectators. Riding majestically and in perfect safety upon the water, the gunboat was an object of pride to her builders, and one of wonderment to the chagrined prophets who had predicted disaster.

The *Michigan,* or rather the *Wolverine,* is one hun-

GUNBOAT *WOLVERINE*, IN PRESENT-DAY TRIM



THE OLD *FESSENDEN*, U. S. REVENUE CUTTER

dred and sixty-four feet long, twenty-seven feet beam, and her draft is nine to eleven feet. The hull is of rigid strength and toughness not excelled by the latter-day science of shipbuilding, and the rolled plates of her sides are of a quality of iron almost unknown to-day. It is of the kind called "charcoal-iron," containing a percentage of carbon, somewhere about 1.20, which is considered an excess in modern steel-making practice. The plates of the old steamer are exceedingly tough, yet so pliant that when she strikes a rocky bottom, as sometimes happens on survey duty, the metal simply gives without splitting. They are easily sledged out straight again when the vessel goes into drydock. The structural strength of the old gunboat has been severely tested in her sixty-six years of continuous service; and, after buffeting the storms and gales of the lakes during this long period, she is still good for many cruises.

The *Michigan* always carried three masts, schooner-rigged, although originally the foremast was ship-rigged and continued so until after the Civil War. The yards were removed and the topmasts shortened a number of years ago, and no dependence is now placed in sails as a means of propulsion. The steam power is applied by side paddle-wheels placed amidships, between which rises the rakish smokestack. Forward of the stack is the wheel-house, which originally was a little box-like affair, but through successive rebuilding and enlargement, has now almost reached the proportions of an upper-deck cabin. The bulwarks are high like the warships of the Civil War period, and through the open ports during those exciting times, there grinned as wicked-looking smooth-bores of the muzzle-loading type as ever were fired in deadly conflict.

The battery at the beginning of the war had been increased from the single eighteen-pounder, with which she was launched, to one thirty-pounder, five twenty-pounders, two light twelve-pounders, and six four-pounders. In

after years these antiquated Parrots were converted into breech-loaders and rifled, but they have long since been relegated to the museum of curiosities. She was also armed with muskets and cutlasses, in the days of hand-to-hand fighting over the sides, but even they have been replaced by modern firearms. The present armament, if such it can be termed, consists of six Driggs-Schroeder six-pounders of the rapid-fire type, and two Hotchkiss one-pounders, and although small, are more effective than the old heavy smooth-bores.

The original engines, which still propel the old gunboat at a speed of ten to twelve miles an hour, are practically in as good condition as when built. They are of the inclined cylinder, low-pressure type, with the piston rods connected by intervening rods direct to the main-wheel shaft, and develop about five hundred horse-power. They are slow-acting and of rather a cumbersome design, occupying space to the limitation of a proper boiler capacity. The original steam boilers which saw so many years of service were equipped with grates for burning wood, of which there was a great abundance along the chain of lakes. In the Winter of 1892–93 the old boilers were taken out and two Scotch boilers of steel and of greater steaming power and provided with forced draft, were installed. These are still in excellent condition. In the early days the steamer carried a complete wrecking outfit, and many are the ships she has saved from disaster by her timely aid, as for many years she was the only vessel so equipped on the marine highway of the lakes.

In steaming from the harbor of Erie on her first voyage, the *Michigan,* under the command of Commander William P. Inman, was piloted by Alexander St. Bernard, whose reputation as a skilled navigator was well established throughout the lake region. For more than a quarter of a century he navigated the "iron steamer," as she was then known, through the uncharted channels

and along the dangerous shores of the lakes; and the black-hulled, three-masted gunboat was everywhere looked upon as the vigilant watch-dog of the Canadian frontier. When coursing through the St. Clair River, the pilot, tall and straight in blue service uniform with the regulation brass buttons, was in his own country. His home was on the bank of the river just above the village of St. Clair, and adjoining it was a sawmill with its boom filled with pine logs rafted down the stream. Near by was a dock piled high with cord wood which the settlers cut in clearing their lands, and hauled to market at the steamboat landing.

There was no steam whistle in those days to announce the coming of the "iron steamer," but the noise of the paddle-wheels churning the water in their frantic struggle with the swift current served the same purpose. Almost the entire population of the settlement turned out to greet the pilot, and stare at the black bulldog of the lakes. The sight of the jaunty marines, the loosely uniformed sailors, the big threatening guns, and the polished brasswork, at close range, was attractive. While the vessel was fueling the officers strolled through the apple orchard to the farmhouse on the hill, where they were regaled with the best that the farm afforded.

Not long after the *Michigan* was commissioned in active service, as years are numbered, she figured prominently in the rise and fall of a kingdom, and the assassination of the king within the boundaries of the State whose name she bears. The episode of King Strang and his followers fills a page of unusual interest in the annals of the Great Lakes country. The home of this large colony of Mormons was on Beaver Island, the largest of a group of islands west of Mackinac in the northern part of Lake Michigan. In 1848 there were about a thousand Mormons in the colony, and several hundred fishermen and woodchoppers, who were called Gentiles, made their home on the island. The colonists lived in

warm and comfortable cabins built of hewn logs, and they worshipped in a large temple of the same rough material. The temple, which was provided with a stage and a movable pulpit built on trucks, also served for social purposes and civic meetings, and when so used the pulpit was rolled out of sight. Polygamy was universally practised, but the code of strict laws governing temperance in all things was rigidly enforced. Every Mormon was required to contribute one-tenth of his income for the support of the schools and the church. A weekly newspaper, the *Northern Islander,* was published, and for a time the colony was in a flourishing condition.

In July, 1850, Jesse James Strang, who had been recognized as the spiritual leader of the colony, was crowned King of the Mormons, thus becoming the temporal ruler of the kingdom of Beaver Island. The temple was then known as King Strang's Castle, and the town in which it was located was named St. James, in his honor. The island at this time was one of the best wooding stations upon the upper lakes, and was a regular stopping place of the gunboat to take on fuel.

On one of her visits to the island the fishermen and woodchoppers gave the officers strange accounts of the outrages inflicted on them by the king and his followers. Like the Mormons themselves they were forced to give up one-tenth of their earnings to the treasury of the kingdom, and those who refused to comply with the enactment were waylaid, bound hand and foot, and beaten with whips on their bare backs, until they yielded. The king's lieutenants committed other serious misdeeds; they robbed the mails, they forced the treasurer of Manitou County, who lived on the island, to turn over the public funds; and still not content with these infringements on government protection, the king conducted a private mint. There he made and caused to be put in circulation counterfeit money and bogus coin.

On the evidence of such a condition of affairs exist-

ing within the bounds of a peaceful State, King Strang and his twelve apostles were arrested and taken to Detroit for trial. Although opposed by the best legal talent of the time, the king pleaded his cause so ably that, in spite of the handfuls of counterfeit money from his mint that accused him, he and the apostles were released, and they returned to their northern home.

Soon after this affair conditions on the island became worse than ever, and the king hesitated at nothing to further his ends, for his success in evading the law had made him confident of his ability to escape prosecution. When matters became no longer bearable, the steamer *Michigan* was despatched to the island for the express purpose of arresting King Strang and the ringleaders. Arriving at the island at night the gunboat entered the harbor without being discovered. The officers and a detachment of twenty mariners and twelve deputy sheriffs made a landing just before daybreak. They were all heavily armed as they expected a desperate resistance.

After a long and careful search of the island, which occupied nearly the entire day, the king was discovered in hiding, and while the little armed force was beating through the brush to apprehend the other leaders, the pilot conducted the prisoner to the ship. No resistance was offered by the king and he went along in a jovial mood, joking with his escort on the way to the wharf. As they entered a long dark lane between high piles of wood, some of the king's enemies sprang out from cover and fired their guns point-blank at the prisoner. He fell to the ground mortally wounded and died soon after. The assassins fled to the ship for protection from the fury of the Mormon mob, and were taken to Mackinac and imprisoned, but were never brought to trial.

Although the tragic ending of the island kingdom took place more than a half-century ago, there still exist many reminders of the stirring events. The principal village, St. James, is situated near the north end of Big Beaver

Island, and on the shores of Beaver Harbor. A fine road leading into the interior of the island is known as the King's Highway; the largest island lake is the Sea of Galilee, while a trout stream running through a ravine is called the River Jordan. The Mormon temple, like the faith itself on the lake island, has long since fallen to decay, and only charred logs and a few stone chimneys remain to mark the ruined habitations of a once prosperous community.

During the Civil War the old *Michigan* was the only gunboat or armed vessel on the Great Lakes, and she was kept busy cruising along the shores of Lake Erie and through the connecting rivers to Lake Huron. In these troublous times there was constant danger of invasion and raids from across the border, and more than once the presence of the gunboat at a critical time prevented serious complications. In 1864 the rebel refugees in Canada organized to invade the United States at some convenient point along the frontier. They plotted to take possession of a number of steamers plying on Lake Erie and then to seize the *Michigan*. Without fear of attack on the water they would fall upon the garrison on Johnson's Island, in Sandusky Bay, and free the rebel prisoners confined there. With these recruits to man the captured vessels they were to make an attack on Buffalo and other lake cities.

It was a very clever plot and in the execution of it the conspirators started well. On September 19, 1864, they seized the steamer *Philo Parsons*, while on her regular trip from Detroit to Sandusky, and at Amherstburg, on the Canadian side, they were joined by about thirty other rebels who brought on board a quantity of arms and ammunition. At Middle Bass Island they captured another though smaller steamer, the *Island Queen*, together with twenty-five Union soldiers who were surprised aboard her. Meanwhile the Government, having been informed of the details of the movement, had arrested

the rebels who had stationed themselves at Sandusky to aid the insurrection, and the gunboat *Michigan's* decks were cleared and the guns made ready for action.

The steamer *Philo Parsons,* with the rebel leaders in command, entered the bay very cautiously, but at about her usual time so as not to excite suspicion of the United States authorities, and advanced slowly until within a mile of the Union gunboat. They had expected signals from the shore, but seeing none such as had been agreed upon, they became suspicious and turned back. Putting on all steam and driving the engine to its full speed they dashed for the open lake. With shell and canister from the gunboat slashing the water about her and with a few shots falling on her decks, the little passenger steamer gradually pulled away from the warship, and escaped around Pelee. They pushed on to Sandwich, a Canadian town on the Detroit River. There the steamer was abandoned, and under cover of night the conspirators sought refuge in the interior of Canada. Thus the raid ended rather ingloriously but without the shedding of blood; and the peace of the bordering States was not again threatened from outside forces during the continuance of the war. The *Michigan* maintained a constant patrol of the lake and river and in a measure allayed the fears of the inhabitants of cities and towns thereon, of invasion and violence.

After the Civil War was ended the Fenian raid and invasion of Canada, in 1866, brought the old gunboat into further prominence. She captured the invaders redhanded, the account of which given in the "Army and Navy Journal," in an issue of the time, faithfully narrates the skirmishes of the invasion, and the capture of the Fenians.

"On Thursday May 31, a considerable number of Fenians had quietly gathered into Buffalo, calling themselves laborers bound for California. At about half-past two the next morning they had collected at Black Rock, some three miles north of

Buffalo, and here they at once crossed the Niagara River by the aid of two tugs and four canal boats. They landed safely under the green flag and at once took possession of the ruins of Fort Erie, just at the place where the lake narrows to the river. Their number was somewhere from one thousand to fifteen hundred. Their military organization consisted of four regiments, the Thirteenth, or Tennessee, the Seventeenth, or Kentucky, the Eighteenth, or Ohio, and the Seventh, of Buffalo. All these had colonels, and the whole was under the command of Colonel O'Neill, formerly known as having enlisted a regiment for the rebels of such of our soldiers in the horrible den at Andersonville as preferred dishonor to death.

"This crossing had been successfully concealed from the United States authorities. At embarking in the Fenian fleet the men received arms and ammunition, but no commissariat seems to have been organized. They at once cut the telegraph wires leading into Canada, tore up the track of the railway near them, and advanced westward along the shore of the lake toward Port Colborne, at the mouth of the Welland Canal.

"The first Canadian force to come into actual conflict with the Fort Erie Fenians was a body of about fourteen hundred volunteers, under Colonel Booker, or Buchanan, which had hastened to Port Colborne; while another force, under Colonel Peacock, was advancing on the Fenian rear, up the Niagara River, by way of Chippewa. Booker's troops met O'Neill and his Fenians about eight o'clock on the morning of Saturday, June 2. O'Neill was advancing westward and now took post at Limestone Ridge, somewhat less than half way from Fort Erie to Port Colborne. There was a sort of battle, in which — though there are various reports — the Canadians seem to have despised their adversaries, and to have advanced in pursuit of them as if already victorious, when the Fenian line was merely falling back to rectify an error. Many of the Fenians are veterans of the Rebellion and not to be discouraged in a charge, so they charged bayonets in their turn upon the confident Canadians, and very easily dispersed them. But the losses reported were only six killed and fifteen wounded on the Fenian side, and twenty-three killed and wounded on the Canadian side.

"After pursuing the beaten Canadians for some distance, the Fenians fell back toward Fort Erie. They had impressed some provisions at that place, but their supplies quickly fell short, notwithstanding what they could find in the vicinity. More Canadians were coming up from Port Colborne; Peacock's force was approaching from Chippewa; the *Michigan* and one or two

Weighing anchor "All hands to"

Basking in the sunshine

Scenes on board the *Wolverine*

Bluejackets

Sub-calibre gun practice

Scenes on board the *Wolverine*

tugs had effectually closed the Niagara River to reinforcements. As the Fenians approached Fort Erie again they had a brush with a small Canadian force, but easily dispersed it; and at night, worn out with fatigue and hunger, the Fenians attempted to escape back into the United States. Their main body was promptly captured, with the tugs conveying them on scows, by the *Michigan;* the stragglers and pickets were left on the Canadian side and were taken by Colonel Peacock's force, which went into camp at Fort Erie; and the left flank movement of the Fenian invasion was over and a failure, and its troops were prisoners to United States District-Attorney Dart, though in the immediate charge of Captain Bryson, of the *Michigan.*"

Of late years the old gunboat has become an object of curiosity wherever she cruises, but the old mariners of the lakes look with a kindly regard, bordering on reverence, upon the trim pioneer of vast fleets of iron and steel merchant marine. With all her old-fashioned rig, the projecting wheel-boxes, and the small guns bristling from her ports, she presents a rather pleasing picture, a reminder of the departed glories of the old navy. All the upper works of wood in the old steamer have been renewed from time to time so that she is still in good cruising trim.

Until a very recent date all the work about deck was done entirely by the force of human strength. The crew manned the capstan whenever the anchor was weighed, or less frequently when the ship was warped about or along her dock; they laid hold of the fish-falls and catted the anchor; they grappled the boat hoists in swinging the yawls and cutters in the davits; they operated the ash hoists and they coaled the ship. With modern equipments all this is changed. A steam capstan and winches relieve the crew of the bulk of heavy manual labor, and speedy steam cutters transport officers and men to and from the vessel and the shore, as well as the supplies to the ship.

But still there is plenty of work for the sailorman.

He must holystone the decks, polish all the bright work, scrape the masts and spars, and keep the hull in a state of glistening whiteness. Besides, there are always special duties and assignments, signalling, and messages to the shore, and watch shifts to fill. After all, the "jackie" is a busy man on duty.

During the greater part of the navigation season, for a number of years, the *Wolverine* has been engaged in special survey duty along the chain of lakes between Buffalo, Chicago, and Duluth, recharting the channels and dangerous reefs and shoals. More recently she has been detailed to the recruiting service which seeks the enlistment of young and able-bodied men to serve in the navy. This duty takes her into every port of the Great Lakes, and everywhere she calls there is an enthusiastic welcome awaiting her officers and crew. The trim old craft is usually thronged with visitors and not infrequently there are some who recall service on her forty or fifty years ago. From every consideration she must be regarded as of the utmost historical interest. Her calls in port generally result in an increased number of applications for service in the navy, and the lake States have become in recent years the best recruiting ground in the country.

When the winter's ice and snow checks navigation, the old steamer finds a safe berth in Erie Harbor, and alongside the dock where she has tied up for so many years, and near the spot where she first dipped into her natural element, she waits the coming of another spring. The officers and crew remain on board, and with light duties and few cares, idle the four months or more away.

CHAPTER XIV

FROM WOOD TO IRON

First Merchant Vessels of Iron — The Anchor Liners — Wooden Vessels still Constructed — Popular Steamers and the Lake Superior Service — Brigs, Brigantines, and Schooners Fast Displaced in Eighties — Converted into Tow Barges — Success of Steam Barge — The Cheapest Carrier — Rabbits — Railroad Liners — Enormous Profits of Steam Tugs on Detroit River in Late Sixties.

WHILE the good warship *Michigan* was cruising for the first time through the lakes, to the astonishment of the natives and the inhabitants of the ports, another though smaller iron vessel was being put together at Oswego. It was the United States iron propeller *Jefferson,* built in 1844, of material rolled at Pittsburg, and launched in Lake Ontario for service in those waters. Like the stanch side-wheeler, the frame and plates were hauled over the rough roads, through the wilderness, to the shores of the lower lake, and, when ready for sea, the trim little screw propeller registered three hundred and sixty tons. It was fitted with an engine of Ericsson's model, rated at one hundred and twenty horse-power, which gave the propeller a speed of six or seven miles an hour. There was also built at about this time a small steam sloop, the United States steamer *Alert,* which had a horizontal propeller and is reputed to have been very speedy. These government steamers guarded the boundary line along Lake Ontario and the St. Lawrence River for many years.

The first merchant vessel built of iron, and flying the British flag in Canadian waters, was the steamer *Richelieu,* of one hundred and sixty-seven tons. It was one hundred

and thirty feet in length, and was put in service in 1845. The following year the iron steamboat *Caspian* was launched in Ontario waters, measuring one hundred and seventy-seven feet in length, and registering nine hundred and fifty-seven tons. In 1847 the paddle steamer *Hamilton,* one of the first of the Richelieu Steamboat Company's fleet, was built for service on the St. Lawrence River, and was of nearly the same register as the *Caspian.* The steamer *Niagara,* built in 1856, was of three hundred and ninety-six tons, measuring one hundred and fifty-nine feet in length. These iron steamers, although beyond a half-century of continuous service, are still in commission.

Of all the fresh-water craft built prior to 1860, but few remain to-day to contend for a share of the present lake commerce. To place the number of veterans still in sailing trim at thirty, would probably equal, if not exceed, a true estimate. Aside from a half-dozen of the iron-hulled vessels, built in the decade of 1840–50, the others are wooden schooners which appeared in the fifties. By ones and twos they drop from service and find a final port in the shifting sands and soft mud of some marine graveyard, in the end mingling their bones with others — all that remains of a once proud merchant navy. In point of tonnage they are not missed, as they are small in cargo capacity, ranging from one hundred to four hundred tons; but with their passing much of the romance and picturesqueness is lost to the marine panorama of the lakes.

With the opening of navigation in 1860, however, there were along the entire chain of Great Lakes, one hundred and thirty-eight steamboats, of an aggregate tonnage of 69,150; one hundred and ninety-seven propellers, of 67,550 tons; and eleven hundred and twenty-two sailing vessels of all classes, with a carrying capacity of 252,125 tons. The total of one thousand, four hundred and fifty-seven vessels had an aggregate tonnage capacity of 388,825, and constituted a merchant marine of no

mean proportions. In the measure of values of the time, the lake shipping was worth about six million dollars; and the value of the commerce, represented by the freights, both import and export, approximated sixteen million dollars. The number of fresh-water tars, engineers, and officers of the marine was fully fifteen thousand.

The first merchant vessel built of iron under the United States register was the propeller *Merchant,* which was launched and put in service in 1861. It was of six hundred and fifty tons' burden and was one hundred and ninety feet in length, twenty-nine feet beam, and fourteen feet depth of hull, costing sixty thousand dollars. After twenty years of continuous service on the lakes, this steamer, which was one of the first of the old Anchor Line, was wrecked on Racine Reef in Lake Michigan, and proved a total loss. The machinery, however, was recovered and placed in a wooden steam barge then building at Marine City, named the *A. L. Hopkins.* This was in 1880, and the barge is still in commission. In 1868 the same line built at Buffalo the steamer *Philadelphia,* of one thousand, six hundred tons, which sailed the lakes until 1893 when it was lost in collision with the steel steamer *Albany,* off Point Aux Barques, in Lake Huron, both vessels going to the bottom in deep water. The only other iron vessels built during this decade (1860–70) were four small tugs, ranging in size from eleven to twenty-two tons.

In Canadian waters during this decade there were built two iron steamers, both by the Richelieu and Ontario Line. They were paddle steamers of large size for the period, and are in service to-day. The *Quebec* was commissioned in 1865, and measures two hundred and eighty-two feet in length, with a tonnage of two thousand, six hundred and fifty-six. The *Canada,* although smaller, was built the following year, and is two hundred and forty-eight feet in length and registers one thousand, seven hundred and sixty-eight tons. The name of this steamer was changed

some years ago to *St. Irenee.* In 1870 the same line added the iron paddle steamer *Berthier,* and in 1871 the steamers *Chambly* and *Terrebonne,* and the *Three Rivers* in 1874. These are smaller vessels than the two preceding, but were important additions to the fleet, and were used principally in the upper St. Lawrence navigation, where the craft were restricted in size to the limitations of the canals. In 1875 the Grand Trunk Railway had constructed the iron paddle steamer *Huron,* for transporting cars across the Detroit or St. Clair Rivers, thus connecting their lines from the east through Canada with those stretching toward the west. This car ferry is still one of the fleet operated by the railway between Detroit and Windsor.

From 1870 to 1880 about twenty iron vessels were built, flying the American flag on the Great Lakes, and with few exceptions these stanch and seaworthy craft are still to be seen at intervals in the principal ports. In 1871 there appeared four large iron steamers of the submerged screw type, commonly called "iron propellers," of one thousand, two hundred and forty tons. They were named the *Alaska, China, Japan,* and *India,* and plied between Chicago and Lake Erie ports. Besides having a large cargo space for package freight and grain, they were fitted out to accommodate the best class of the travelling public, and for many years the line has enjoyed a large patronage. Although now listed in the obsolete class these famous steamers are still in service. It is doubtful if any four steamers contributed more to the popularizing of lake travel, to about 1890, than these liners.

During 1872 the iron steamers *Cuba* and *Russia* were built, and three small tugs, while in the following year there appeared the *Arabia,* the *Arundel,* and one tug. The *Cuba, Russia,* and *Arabia* were slightly larger and of a little greater tonnage than the *Japan* class. In 1874 the steamer *Huron* was put in service, of one thousand, nine hundred and forty-five tons, — one of the

largest on the lakes. In 1879–80, the side-wheel steamer *Idlewild* and the propellers *Lehigh* and *Boston* were added to the fresh-water fleet. This retrospect of the iron-hulled vessels, covering a period of about thirty years, brings the chronicle of marine progress, so far as the transition from wood to iron is concerned, very near to the advent of the steel ship, which has revolutionized the traffic of the Inland Seas.

But during this period just preceding the introduction of steel in shipbuilding, the construction of wooden vessels, to be propelled either by wind or steam, went on apace. The use of wood was much favored by the old "sea dogs," and for this preference there were good and plausible reasons. In their estimation no material could take the place of the traditional white oak, nor could the keel, ribs, knees, and sheathing be made so strong of any other. They said that iron was cold and rusty, and, being so heavy as to sink in water, it would never be much used. These views were strengthened by the continued activity of the shipyards in the construction of wooden vessels of all classes.

For a few years preceding and during the Civil War, the steamers *Queen City, Arctic No. 1, Lady Elgin*, and *Meteor* were popular vessels in the Lake Superior trade. The *Lady Elgin,* which plied between Chicago and Milwaukee, was, perhaps, the most largely patronized, and will be remembered by thousands of travellers as well as others who did not take passage on the commodious and comfortable steamer. It will never be forgotten because of the terrible marine disaster which overtook it in 1860, with a loss of nearly three hundred lives. The *North Star, Iron City, Lac la Belle, Pewabic, Northern Light, Coburn,* and *Meteor* figured largely in the traffic to the upper lake ports.

In the shipyards of the lower lake ports in the late sixties and during the decade following, many wooden vessels of moderate size were built to accommodate the

increasing commerce of the lakes. Among the steamers plying in the local trade of Lake Erie and Lake Huron, were the *Jay Cooke*, the *Pearl*, the *Chief Justice Waite*, the *Dove*, the *Gazelle*, the *Susan Ward*, the *Forest Queen*, the *George L. Dunlap*, the *John Sherman*, the *Lake Breeze*, the *J. L. Hurd*, the *Phil Sheridan*, the *Annie L. Craig*, the *Benton*, and the *George L. Clinton*. The steamer *Jay Cooke* was named for the financier of the Civil War, who occupied "Gibraltar," a high rocky island in Put-in-Bay, for his summer home. It was built in 1868, and plied for twenty years between Detroit, the Islands, and Sandusky, making daily trips. In 1888 the steamer was rebuilt and renamed the *City of Sandusky*, afterward running between that city and the Islands. Seven years later the popular old steamer was dismantled, her engines placed in the new steel vessel *Arrow*, and her hull consigned to a watery boneyard in the Detroit River.

One of the largest and most popular lines operating between Buffalo, Cleveland, Detroit, and Duluth, was Ward's Central and Pacific Lake Company, which was composed of ten first-class steamers, making five departures each week from either end of the route. The large steamer *Keweenaw*, which was more than three hundred feet in length and very speedy, was built in 1866, and for many years was a prominent factor in this trade. Other well-known steamers were the *Northwest*, the *Iron Sides*, the *Sea Bird*, the *St. Paul*, and the *St. Louis*. A competing line was the Union Steamboat, and Atlantic, Duluth, and Pacific Lake Company, which operated the steamers *Winslow*, *Arctic No. 2*, *Pacific*, and *Atlantic*. The local trade of Lake Superior was well cared for by the Duluth Lake Transportation Company, which ran the steamers *Metropolis* and *Manistee* between Duluth and Marquette, making the way ports in semi-weekly trips. The side-wheeler *Ivanhoe* ran between Houghton, Hancock, and L'Anse, making daily trips through Portage Lake and Keweenaw Bay.

The service from Chicago and Milwaukee to Lake Superior ports was rendered, about 1870 to 1875, by the steamers *City of Madison, Cuyahoga, Ontonagon, Norman, Mineral Rock,* and *Peerless.* The last named steamer was a most popular passenger craft on this route for upwards of thirty years, but was finally displaced by a modern steel leviathan. The Canadian steamers under the British flag, ranging in size from four hundred to six hundred tons' capacity, which were engaged in the Lake Superior trade from Sarnia and the Georgian Bay ports, from 1856 to 1872, were: the *Gore,* the *Plough Boy,* the *Rescue,* the *Collingwood,* the *Algoma,* the *Waubuno,* the *Manitoba,* the *Acadia,* the *Chicora,* the *Cumberland,* and the *Frank Smith.* Of these the *Chicora* was notable in having been a blockade-runner in the Civil War, sailing to Charleston, S. C. It was rebuilt in Liverpool, England, in 1864, and, after the war, was taken to Quebec, cut in two, and passed through the St. Lawrence and Welland canals to Buffalo. There it was rebuilt and put on the Collingwood line in 1869. The engines of this steamer were marine of superior workmanship and, if the accounts of the time are true, afforded great speed.

In point of numbers the sailing vessels on the lakes reached the greatest height in 1868, when the total was one thousand, eight hundred and fifty-five, registering a tonnage of two hundred and ninety-four thousand. Although the white-winged schooners, brigs, brigantines, and sloops began to decline in force, the aggregate carrying capacity continued to increase. This was due to the fact that the new shipping, which replaced the vessels shipwrecked or put out of commission by reason of old age or unseaworthiness, was composed of much larger units. At the end of five years, or 1873, the number had decreased to one thousand, six hundred and sixty-three, but the tonnage in that time had increased to two hundred and ninety-eight thousand. The total tonnage of all classes of vessels, including steam and barge,

was five hundred and twenty-one thousand, embracing two thousand, six hundred and forty-two hulls.

During this slow constructive period there appeared a quaint and curious lake schooner, the three-master with a great square sail on the foremast, and a triangular "raffie," sheeted out on the squaresail-yard and hoisted to the foretopmast head. This was a combination never seen where winds blow briny, and even now the fresh-water breezes know it no more. A generation ago the lakes and connecting straits were picturesque and gay with this interesting type, sometimes beating through, sailing free with everything set, or running wing-and-wing before the wind with "flowing sheets and a following sea." Many a fortune was made in those halcyon days of the old marine, for freights were fabulously high, and good and fast schooners often paid for themselves in one or two seasons. In those days the schooner *Levi Rawson,* of four hundred tons, built in 1861; the *General Franz Sigel* and the *Unadilla* of about the same size, built in 1862; and the *City of Buffalo,* the *City of Milwaukee,* and the *City of Chicago,* were trim and fast vessels. The schooner *Ogarita,* built in 1864, was flat-bottomed and beamier than any craft of the kind then afloat, and registered six hundred tons, with measurements of one hundred and seventy-three feet length and thirty-nine feet beam. Other smart vessels were the *P. C. Sherman, Invincible, Sam Flint,* and the *M. S. Bacon.* The *Lotus* came out one spring with a varnished bottom, her captain having an idea that it would preserve the wood, make the surface more slippery, and thus increase the speed. When the bolt-heads began to drip rust and the experiment had proved a failure, the hull was painted black. After years of service these famous schooners were converted into "lumber hookers," their topmasts were removed and they ended towing wearily behind some steam barge.

Full-rigged brigs became extinct about 1869, it is

supposed with the loss of the *Robert Burns,* in the straits, with a loss of ten lives. The composite vessels called brigantines were counterfeits of the real ocean type, and were well calculated to stir the salt-water sailor to scorn. The *Michigan* was the first double-decked schooner on the lakes, being sailed many years by Captain Fred Hart. The *James Crouch,* afterward named the *Tasmania,* built in 1871, was the largest schooner then afloat. It was of one thousand tons' burden and measured two hundred and twenty-one feet in length by thirty-five feet of beam. The *Julia Barnes,* of three hundred and thirty tons, built in 1872, and the *Scotia,* of nine hundred tons, which appeared the following year, were the fastest on the lakes. The schooner *Wells Burt* was lost near Chicago, in 1863, with the entire crew.

An old-time mariner who had sailed the lakes for years, and as an owner, once said:

"Each year the ports of the Great Lakes contain many old wooden schooners which will never know another fitting-out time. Sailors will point to them as the crack boats of their time. When they came out they were the pride and wonder of marine men. Their races from Chicago with cargoes of grain were more exciting than any yacht regatta. When the wind went to the southward they started out thirty to fifty strong and headed proudly and straight for South Manitou Island. Their sails were new and white, their masts were scraped, their decks were scoured, and as they drove past Grosse Point, they made a beautiful marine picture. The first man to reach the ice, near the Straits of Mackinac, was as proud of his ship as himself. Those were the days when a captain was a Captain, for he generally owned his own boat and sailed it as he willed."

Of all the large number of sailing craft which formed the greater part of the lake marine in 1873, but a small portion now remains afloat, and each year sees from ten to twenty stricken from the lists. Some are stranded in the inviting sands of the lake shores, others bring up on hidden reefs or founder in mid-lake during violent gales, while still others meet their end by collision or fire.

As each year goes by those which escape the furies of the elements are less stout and seaworthy, for their timbers and sheathing are showing the ravages of time, and the chances of disaster are multiplied. Upon the whole chain of Great Lakes there are probably not to exceed two hundred of the old-time craft in sailing trim, and in a few years more white sails and the real sailorman, "the fresh-water tar," will be things of the past. They will not be forgotten memories, however, in this generation at least, for the romance and picturesque beauty of the old days on the lakes will ever remain fresh in the minds of those who knew them.

The advent of the steam barge, in the early sixties, marked the beginning of a new era in the freighting of heavy, coarse commodities; and to this type, with the consequent adoption of a system of tows some years after, is due the rapid decline in rates. In 1859 the freight on grain from Chicago to Buffalo was about sixteen cents a bushel, ten or twelve years later it had dropped to seven or eight cents, and in the eighties, when the towing system was in full operation, it was five cents. The ore rate in 1867, from the Superior to the lower lake ports, was four dollars and a quarter a ton; within five years it had been reduced to two dollars and a half, and it continued on the downward scale as larger and faster steamers were built especially for this business. The rates on coal, which commodity formed the return cargoes for the ore steamers, were also affected by the changed conditions of the traffic, and in a proportionate degree.

The first steam barges introduced in the traffic were very much of an experimental character, and were built of dimensions to fit the old canals, or about one hundred and forty feet length, twenty-six feet beam, and nine feet draft. These steamers registered about two hundred and fifty tons net, and were largely used in the interlake commerce from upper lake ports to Lake Ontario and

"Tows"

A "RABBIT"

the St. Lawrence River. The keenness of competition, however, soon taught the lesson that the larger vessel was the cheaper carrier; and from that conclusion there naturally resulted an abandonment of the Welland Canal route by the new barges, built of larger measurements and greater capacity, for economic reasons. There is no doubt that the steam barge was the cheapest carrier at that time evolved, and as the number of large ones increased the well established and time honored business of the sailing vessel was seriously undermined. This condition was particularly true in the traffic between the principal ports, which left to the sailing craft the uncertain business of a local nature to and from the ports where the shallowness of the channels barred the larger steamers.

The owners of the stanch and fast sailing schooners were thus brought face to face with the most serious problem they had ever encountered, but in time it resolved itself into a general proposition of the "survival of the fittest." The old and rotting hulks were the first to be abandoned; then those craft of the beamy and rather ugly type were dismantled, and finally the proud three-masters were laid up to await better times. It is to the credit of the ingenious sailorman of the fresh waters that the opening of a new field of usefulness for these craft was not long delayed. The evolution in the past thirty years has been rapid, but at no stage has it been more marked than in the introduction of "tows," a system of lake navigation devised and proposed by some prosperity-seeking mariner, now unknown. In the unfolding of this scheme the topmasts of the idle schooners were removed and all sails and hamper, excepting the fore, main, and aft sails, were taken down and stowed away. Then, with decks cleared and with stout hawsers over bow and stern, they towed two, three, four, and even six in tandem formation behind some steam barge. With their moderate sail power they aided ma-

terially to the despatch in favoring winds; and in times of rough weather and gales they kept the long line intact and far steadier, with one or two reefed sails set. This was probably the most dangerous period of lake navigation. The barges, as they had then become, were often láden to the plank-sheer and with deck-loads of lumber, shingles, or lath, were unwieldy craft and top-heavy and stood little chance of riding out a storm, if, by the breaking of a tow-line, they became separated from their consort.

The products of the Michigan forests, which added greatly to the commerce of the lakes between about 1865 and 1895, sought the eastern and southern markets by the water route almost exclusively. The chief ports of distribution to the retail markets were Sandusky, Cleveland, Tonawanda, and Buffalo; and from the Saginaw River and the Lake Huron shore were shipped many billion feet of lumber, shingles, lath, fence posts, telegraph poles, and heavy building and ship timbers. Salt, which was made from brine pumped from underlying strata, by the aid of the waste steam from the sawmills, also formed a considerable article of commerce. This important commodity was shipped in barrels mostly by "rabbits," a modified type of the steam barge. These were built on different lines, were of low freeboard without the high bow, and with the wheelhouse aft of the waist section, and in front of the short upper deck cabin. The "rabbits" also carried stone, coal, and pig iron and often towed barges of a smaller class which could enter the lesser ports of shallow-water channels. These quaint old craft are fast passing from the twentieth century life of the busy waterways, but they were worthy of respect for their many battles with the elements, notwithstanding the irreverent sailorman has dubbed them "coffins," and other names more expressive in the language of scorn. A lone barge or tow may occasionally be seen in these days, sometimes running up light if no coal car-

goes are "in sight," but, if fair weather favors them, they soon return laden deep with cargoes of lumber or other products of the forest. Many of the old-timers are owned and operated by the large lumber concerns still doing business in Chicago, Detroit, Saginaw River, and the Lake Huron shore. Of these interesting old craft which still claim a share of the "pick-up" or tramp business of the lakes, the *Maine*, built in 1862, the *Homer Warren* in 1863, the *Saginaw* in 1866, the *Sanilac* in 1867, the *Robert Holland* in 1872, the *Oscoda* in 1878, and the *William Rudolph,* in 1880, are fair examples.

Another type of lake steamer, which once played an important part in the through commerce of the vast lake region to the Northwest and the East, was known as the "railroad boats." They were owned and operated largely by the Eastern trunk lines of railroad, running to the seaboard. Their route lay from Chicago to Buffalo, and they could stow away several train-loads of merchandise or grain in their capacious holds. The principal feature which distinguished them was the huge truss running fore and aft on each side, giving them the appearance of having been built around a section of a railroad bridge. This form of construction gave rigidity and strength, and they were classed as safe, strong vessels. One by one they have been displaced by modern, fast steamships of steel, and only at the basins at terminal ports are they to be seen these days, tied up, swinging lazily with the current, the green shutters of their cabin windows banging in the wind.

In the good old days of the lakes the tug boat earnings were often enormous, and in 1866 it reached a figure almost beyond belief. The straits connecting Lake Erie and Lake Huron are very narrow, and a swift current of about three miles an hour runs through the St. Clair and Detroit Rivers. Near the mouth of the latter stream is the "hell-gate," of the Great Lakes, a narrow rock cut, through which the sailing craft could only creep with

the aid of a guiding power. There were about thirty-five tugs on the Detroit River engaged in towing vessels through the strait; and there was keen rivalry between them and some cutting of rates until an association was formed of the largest tug owners to maintain a regular schedule of prices and distribute the work more evenly. In 1866 the thirty-three tugs in the association earned $694,855, or an average for each tug of more than twenty-one thousand dollars. The net profits of their operations were $325,229, or an average of nearly ten thousand dollars. In those palmy days a tug would sometimes earn a net sum equal to its original cost, and some of them, such as the tugs *Satellite* and *Masters*, with more than twenty-three thousand dollars each to their credit, and the *Moffat*, with more than fifteen thousand dollars, certainly did better. The steam barge and the lake freighter, which took from the sailing craft their best trade and large profits, also caused the little steam tug to seek other fields of operation. This it did by entering the towing business of the streams in the rapidly developing lumber districts along the Lake Huron and Lake Michigan shores.

CHAPTER XV

THE RIVER FERRIES FROM HAND TO STEAM

Era of Steam — Early Hand Ferries — Horse Ferries — First Steam Power Ferries on St. Lawrence and at Toronto — Detroit River Ferries of Early Times — The *Windsor* — Its Burning — Modern Steam Ferries — Incident of Winter, 1887 — Other Ferries at Port Huron and Mackinac.

THE era of steam, in which there has been witnessed the greatest advance in the mechanical arts since the early civilizations, has wrought many and great changes in the modes of navigation throughout the world. One evidence of this is the remarkable development in the past century of the steam tonnage upon the high seas. From the little side-wheel steamer *Brittania,* which was the first vessel propelled by steam to make regular trips across the Atlantic, to the giant *Mauretania,* there is a wide transition. From the first steam frigate, the *Princeton,* of the United States navy, to the indomitable battleship *Florida,* there is shown an evolution of power almost beyond belief. From the Hudson River steamboat, the *Clermont,* to the stately *Hendrick Hudson,* there is manifest a vast improvement in respect to speed and accommodations for travellers. Coming inland, as between the *Walk-in-the-Water* and the latest leviathan of the passenger fleet on the Great Lakes, no comparison can be drawn. The only feature in common possessed by them all is a power plant, the motive energy of which is steam. Beyond that there is no similarity either in model, materials, or construction.

Upon no inland waters of the world is there to be

found a marine comprising so many and varied types of steam vessels as that of the Great Lakes of America. In this generation many of the old-timers are objects of curiosity to the landsman, while the salt-water "tar" looks upon them, and also the modern types of the lake craft, with astonishment and scorn. The habitual traveller on the lakes, however, and perhaps the casual tourist, view the big freighters, the giant ore carriers, and the speedy passenger steamers with reverence, wondering the while what cargoes and power installations are carried in their cavernous holds. If they inquire what practical reasons there may be for some of the strange and novel types, in all probability they will be told that in a general way the fresh-water craft are better adapted to the special and peculiar uses of the lake service than any other types of ships would be.

As evidence of this fact the steam barge and its "hookers" towing wearily behind, sometimes to the number of five or six, have never been equalled as economical carriers of lumber and other products of the forest. Likewise, the little "rabbit," a modified type of the barge, is most economical in the freighting of salt, stone, coal, and other heavy, coarse commodities between ports, the shallow channels of which bar the modern steel freighters. The great ore carriers of the lakes are the largest bulk freight vessels upon any waters of the globe, and they transport larger cargoes and at a lower rate, considering the short haul, than any vessels ever built. The splendid package freighters of large cargo capacity and speed maintain regular schedules from end to end of the lakes, regardless of storm or gale. The through rates from the West to the seaboard, in connection with the Erie Canal, are so low as to be beyond any railroad competition. Another type not before mentioned but of exceeding interest is that of the railway car ferries, which for about thirty years have been familiar to travellers, at least on the connecting rivers between Lake Huron

and Lake Erie. Within recent years they have become important factors in a vast commerce flowing from the West across Lake Michigan.

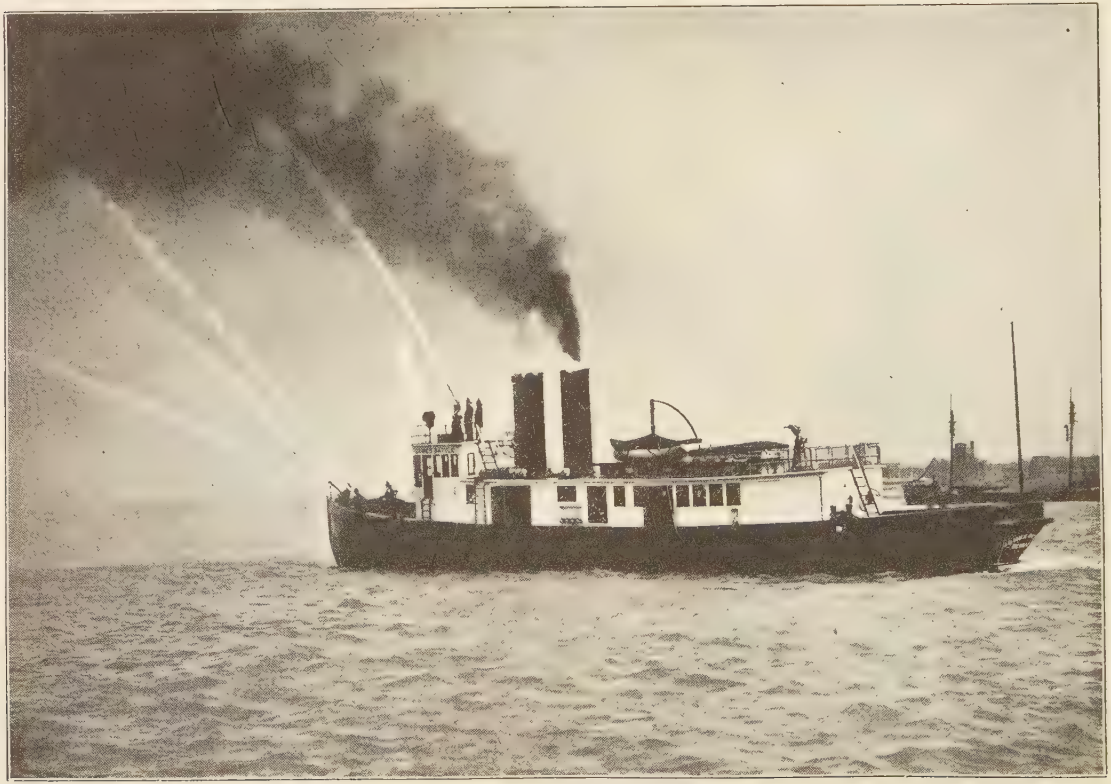
But long before these big black transports had been devised, or even thought of, the rivers were crossed and recrossed by other and simpler means. In the days of the Revolution a ferry was maintained on the Niagara River, at Black Rock, and was the first of authentic record above the great cataract. It was a hand ferry and consisted of a flat-bottomed scow, propelled by long sweeps moved by human strength. The landing on the American side was the historic "black rock," — a broad flat rock about one hundred feet wide, extending into the stream nearly the same number of feet. Its top was four feet above the surface of the water, and formed an excellent landing place for the birch-bark canoes and the light bateaux of the early explorers. Here La Salle and his little band of intrepid followers embarked in the *Griffin*, and, with a salute of the brass guns and musketry, sailed away to join Tonty in an expedition for the discovery of a new passage to the Pacific. From the same spot the first steamboat, the *Walk-in-the-Water,* breasted the swift current with the aid of the "horned breeze," and steamed out into Lake Erie to the astonishment alike of the natives and the inhabitants along the shore.

In 1800 an enterprising boatman, named O'Neill, living in a log hut near the "black rock," built and operated a hand ferry from this historic landing to the Canadian side. Six years later Major Frederick Miller took the ferry and conducted it until 1812. From that time until 1821 another sturdy pioneer in the business, Lester Brace, conducted the convenient ferry, and it was only displaced by a new and more novel power boat which appeared in 1826. This was the first horse-power ferry on the lakes, and was put in service by L. B. and Donald Fraser. The machinery consisted of a horizontal wheel the width of

the boat, and it was operated by horses treading at each side.

About 1844 another horse ferry was established by Privatt Brothers between Toronto and the small island across the harbor. The boat was named the *Peninsular Packet*, and was a side-wheel affair, operated by two horses. The first power appliance was so constructed that the horses trod on a revolving platform or table, which, by an arrangement of crude gears, transmitted its energy to a shaft. At the ends of this shaft were secured the paddle-wheels. In operation the horses remained in a stationary position, treading away very much as in the old threshing machine outfits where the beasts continually climbed a hill. After about two years of service the cumbersome mechanism was altered so that the horses followed a circular path on the deck of the boat, a principle in use to-day in the simplest power appliances. In this form the boat was operated until 1850. In that year Louis J. Privatt built the little steamer *Victoria*, of twenty-five horse-power, to run from Robert Maitland's wharf at the foot of Church Street. It maintained an hourly service from ten o'clock in the morning until seven o'clock in the evening; and continued on the passage until 1855.

The introduction of steam in the ferry service on the St. Lawrence River was coincident with the appearance of iron vessels in those waters. This was in 1843 when the pioneers of that class, named the *Prince Albert* and the *Iron Duke*, were put on the service between Montreal on one side and St. Lambert and Laprairie, on the south shore. The original Victoria Bridge had not yet been built, and the passengers from the south by the Champlain and St. Lawrence Railway were conveyed across the river to their destination by these steamers. They were built in Scotland, brought across the ocean in sections, and put together in Montreal. In 1845 some small market boats were put on to run between the city and Sorel,



STREAMING WATER-GUNS

Old club at St. Clair Flats

Steamer *Tashmoo*

a point some distance down the river on the south side, in order to enable the farmers there to market their produce. From this small beginning there has developed the largest transportation line in the St. Lawrence system.

The ferries on the Detroit River date from 1825, at which time the scow *Olive Branch* was put on between Detroit and Windsor. It was a primitive affair, and in an advertisement of the ferry it was stated, "for the purpose of transporting wagons, horses, cattle, and passengers across the Detroit River." The passenger traffic then must have been the least important to the boatmen. About 1830 this ferry was displaced by a steamboat named the *Argo,* under the command of Captain Burtiss. It was a side-wheeler and continued in service until 1834, when a rival for the popular patronage appeared, named the *Lady of the Lake.* Two years after, Louis Davenport built and put in service a larger steamer equipped with a high-pressure engine, which he named the *United.* This ferry registered seventy-one tons. In operation, the exhaust from the engine gave such a penetrating sound as to be heard a long distance in clear weather. In 1853 the *United* was enlarged and converted into a wood barge, and plied the lakes for twenty-six years. It was finally sunk in collision at the St. Clair Flats, in 1879.

Contemporary with the *United,* as a ferry, were the *Alliance,* which was added to the course in 1842, and was known a few years later as the *Undine;* the *Argo No. 2,* built in 1848, which soon exploded, killing Captain Foster and several others, but was rebuilt and sailed for twenty-four years by Captain Forbes; and the *Ottawa,* of three hundred tons' burden, built by Dr. Russell, and which ended its career on the Maumee River. In 1856 the side-wheeler *Gem,* of about two hundred and fifty tons, built by W. P. Campbell, was put on in connection with the *Windsor,* a steamer of about the same dimensions which came out that year. These steamers maintained the service with some competition for a number of years. The

Windsor was chartered in 1866 to operate the connecting link of the river for the Detroit and Milwaukee Railroad, carrying both freight and passengers to and from the Great Western Railway docks in Windsor.

Before it had been long in service, however, the ferry was lost in one of the great marine disasters, by which the annals of the Great Lakes are filled. On the night of April 23, 1866, the steamer burned in the river, with a loss of thirty lives. Many other passengers were picked up by small boats, which put off from the dock, and the ferry boat *Detroit,* which happened to be making a landing near by. That the whole water front of the city was not engulfed in a sea of flame was due to the heroic and quick action of Captain Innes, of the ferry *Detroit.* The venerable captain for a number of years has been commodore of the Michigan Central fleet of transports. A graphic account of the catastrophe is told by the captain himself:

"You see it was this way. 'Long about eleven o'clock one night an explosion of oil occurred aboard the steamer *Windsor,* while she was tied to her wharf at the foot of Brush Street. I was captain of the old city ferry, the *Detroit,* at the time, and we had just landed at the foot of Woodward Avenue, with passengers from Windsor. I was standing at the signal ropes on the bridge leading to the pilot house when the *Windsor* took fire. In less than two minutes after the explosion she was a mass of flames from stem to stern. She had perhaps fifty people aboard, as I found out afterwards — passengers and deck hands. In about another minute I saw her lines ablazin' — saw 'em part and saw the *Windsor* startin' to drift down in our direction. By this time the freight sheds on the wharf had caught fire, and I saw men and women leaping over the *Windsor's* rail into the water. I signalled our boys to man the life-boats, and shouted to 'em to make a line fast to her stern. This they did in short order. Then I sends a signal below to back her hard — runs into the pilot house, throws over the helm, and out and away we goes toward the middle grounds. I saw the men in our life-boats trying to rescue those people in the river — and they were surely doing their best. All at once, like the report of a gun, our tow line parted. The *Windsor* was a roar-

ing furnace. We were then off the foot of Wayne Street, on the middle ground where the cross-current runs strong, and I knew unless we could do something to keep the *Windsor* off shore, that when she struck, the whole river front would soon be ablaze, in consequence of her drifting down with the current. But how to keep her out in the channel was sure enough a puzzler. First, I decided to ram her down the river. No, this plan would n't do. The *Detroit* would catch fire and then — what of my passengers — more than a score of 'em. On the other hand, the *Windsor* was drifting fast toward shore. We would have to ram her — and quick, too.

"My men being out in the life-boats left us short-handed — only myself, the wheelsman, engineer, and fireman, and the latter two would have to stay below. Life-boats or no life-boats, we must run the risk. I gave orders to send her full speed ahead — shouted to the passengers and the men to wet down the decks and stand ready with the buckets. Well, in a couple of minutes we struck her. There was a crash of fallin', blazin' timbers. The sparks fell on our decks in a shower, and we were ablaze in a dozen places. But we held on to the *Windsor*, stuck to her, pushed her out into the river, fought the flames on board our boat and headed for Sandwich Point. All told, we must have been two hours gettin' her beached, where she burned to the water's edge.

"Next day a dozen or so Detroit citizens came aboard and offered me a purse of one thousand dollars in gold. Said I had to take it — that I had saved the river front. I refused and laughed 'em out of the notion. Why, anybody who was half a man would have done his best that night of the fire of '66."

The steamer *Essex,* built in 1859, ran for several years between Detroit and Windsor, and in war times many exciting scenes were enacted on her decks, and at the docks on either side, as the ferry at this point was frequently attacked by rebel refugees in Canada, attempting to pass back into the United States. The *Essex* afterward was placed on the ferry between St. Clair and Courtright, on the St. Clair River. The ferry-boat *Detroit* was built at Algonac, in 1864, and was burned in September, 1875, at Sandwich, a few miles below the city on the Canadian side. The steamer *Hope* was built in 1870, but was soon after converted into a propeller for lake

service. The only iron ferry-boat during this period was the *Mohawk,* operated by Captain Chivers. It was built about 1844 for the British Revenue Service, but years after was converted into a passenger steamer, and, after running a number of seasons on the ferry route, was lost on Lake Huron, in 1868.

The modern ferry-boats familiar to the present generation of lake dwellers, and which ply continually during the navigation season between Detroit wharfs, Windsor, and Belle Isle Park, are of recent construction, and are splendid steamers of their type. With their broad decks crowded with eager, pleasure-seeking people, and with bands playing, and flags flying from the peaks, the swift steamers add a touch of romance to the commercial life of the busy stream. The waters, so clear and of the deep blue tinge so entrancing to the landsmen, are constantly churned into swells by the passing and repassing and the crossing of the lanes of the huge car ferries, and the continual procession of lake freighters, so that they present at almost all times the surface of a large lake whipped into waves by lake breezes. But in the swift current the waters rush onward to the expanse of Lake Erie, and thence to the cataract of Niagara. When winter sets in and the surface is frozen, the stanch steamers continue the service every day, in the passage from the city wharf to the Canadian town across the way.

The earliest steamer of the present fleet was built by the Detroit and Windsor Ferry Company, in 1872, and named the *Victoria.* It was a notable advance in ferry-boat construction, inasmuch as the under bow was shaped to crush the ice and pass over it. It proved a great success and kept the channel open at all times during the winter. The steamer is still in service. It registers one hundred and ninety-two tons, and is one hundred and six feet long by twenty-eight feet beam. The ferry *Fortune* was built in 1875, on practically the same lines, but is one hundred and fourteen feet long and twenty-nine feet of beam.

The following year the steamer *Excelsior* was added to the fleet, — one hundred and twenty-six feet in length by twenty-nine feet beam, and registering two hundred and twenty-nine gross tons. In 1883, when the Belle Isle service was inaugurated, the steamer *Sappho* was built, of dimensions one hundred and sixteen by thirty-one feet, and of two hundred and twenty-three tons' register. As the island park, located three miles above the commercial centre of the river's activity, was improved, greater crowds of people were attracted by its beauties, and by 1892, the Detroit, Belle Isle, and Windsor Ferry Company built the steamer *Promise*, for that service. The new ferry was one hundred and thirty by thirty-eight feet in size, and accommodated almost two thousand passengers, yet it was far from large enough to carry the throngs of people who went to the park by the delightful waterway, during the hot summer months.

By 1894 the company was obliged to build the steamer *Pleasure,* of still larger proportions, being one hundred and forty by fifty-one feet. With this fine fleet of fast steamers a twenty-minute schedule is maintained from three landings in Detroit to the island park, and a ten-minute service between the city and Windsor. In 1902 a new service was opened to Bois Blanc Island, at the mouth of the river, eighteen miles below the city, and a mammoth new steamer, named the *Columbia,* was built especially for it. The *Columbia* is the largest and finest ferry steamer for the excursion business afloat upon any water in the world, and has a passenger capacity of three thousand, five hundred. It is nearly a thousand tons' register and measures two hundred and sixteen feet in length of deck. To round out the fleet and provide a large reserve steamer suitable for either the up-river or down-river service, the company, in 1907, built the steamer *Brittania*, which, though of slightly less dimensions than the *Columbia,* is licensed to carry four thousand passengers. The limit is reached almost daily during

the busy summer months, when the tourist travel to and from the island parks is heaviest. The "City of the Straits" is the hub of the lower lake navigation, and from its broad wharfs there are witnessed more steamer arrivals and departures in a navigation season than at any other port in American waters. More than seven and three-quarter million passengers entered the port in 1907. Many of them were tourists and lake travellers attracted by the beauties of the historic river with its clear, pure water, the counterpart of which is not found on the continent.

A certain charm is lent the romance of the old waterway by the tales of exciting scenes and instances of valor and courage enacted upon its surface, but none can equal those told by the old rivermen, whose lives have been spent on the ferry-boats and along the water front. As told in their breezy way, which smacks of the freedom of the seas, they are none the less effective. The humorous element of the river lore is not lacking in the telling, as this tale told by an old ferry captain clearly shows:

"One afternoon during the Winter of '87 we roped a deer off'n the ice and pulled her aboard the ferry. We were out in the middle grounds headed full speed for the Windsor side when we sighted the animal. In less time than it takes to tell it every passenger was out on deck. I ran out on the bridge from the pilot house, where I was greeted with shouts from the passengers of 'Get after her, Cap'n! Get after her! Get out some ropes and we 'll have some fun.' At this time the animal was puttin' fer the Canada side at about forty knots an hour.

"The river was pretty well froze over, with here and there a break and 'wind-flow,' and Mr. Deer was about a quarter of a knot astern, headed due nor'east by east. Decided, on a sudden, we could have some fun, so back I puts into the wheelhouse, sends a full-stop and back-her signal below, throws over the wheel, sends another signal to give her full speed ahead, and down the river we puts. Just when we had turned, the animal runs plump into an ice floe, and in the river he goes kersplash.

"We held our course and soon came alongside. I sends another signal to stop her — orders my men to make ready

with the ropes and clears the deck fer action. Out I runs on the bridge to give orders to my men, when, all of a sudden Mr. Deer raises his bow, hooks his anchors on to the edge of the floe, pulls hisself up and out of the water, and starts on a sixty-mile pace fer the Detroit side.

"Back I puts into the pilot house, orders full speed ahead; helms her to starboard and locks the wheel down tight. By this time those folks on deck were yellin' and shoutin' like so many wild Injuns. Thinks I to myself, 'I 'll give her whistle a blast,' and I did. A few short, quick ones, and then a long one, followed by a few more short blasts, and all at once Mr. Deer makes a few high jumps, stumbles, and falls and slides port side, anchors up, into another wind-break, and goes clear under and out of sight.

"I sends orders below to full-stop and back her hard, runs out on the bridge and orders my men to again clear the decks and make ready. Well, this time we managed to board her. One of my men jumps over the side, runs out with a rope, and just when the animal had again hooked onto the ice with his anchors, he throws his line over the critter's masts, makes fast, and signals my men to throw a 'bowlin-hitch.' I shouts to the men to get some planks over the side and for all hands to pull on the sheet ropes. Say, they could n't budge her. Back I puts and agin toots the whistle. Held her down for a long blast, and with the noise of the whistle and the shouts of the passengers, the animal gets scared, scrambles up atop the ice-floe, and then we thought we had our game sure dead easy. But, the critter drops his anchors and braces hisself so hard thet the men on the ropes could n't budge him. Finally, I orders the boys to make fast to the capstan and then we soon reeled him alongside. Some of the boys jumps over the side and helps to boost the critter over the side. Such yellin' and shoutin' I never before heard the likes.

"All hands then passed their opinions. Some said the animal was a brand commonly seen in the nor'west of Canada, and some 'lowed they had seen the brand in the nor'east'n section. We found out different, however, when we got ashore at the Windsor slip. There among the crowd waitin' to meet us, was a feller who had proof that Mr. Deer, 'Mike,' as he called him, was his property. Said he was a physician and that he lived in Detroit, and that Mike had jumped the back-yard fence the night before."

At the foot of Lake Huron, where the flow of the broad lake narrows to the St. Clair River, there is a

ferry between the city of Port Huron and Sarnia, a town on the Canadian side. Since 1868, the little steamer *Grace Dormer* has maintained a ferry service, to which was added, in 1873, the ferry-boat *James Beard;* and in 1882 the new steamer *Omar D. Conger* was built for the passage of the swift current at this point. The *Conger* is of two hundred gross tons' register, and is one hundred and two feet long by twenty-six feet beam.

Across the Straits of Mackinac at the head of the lakes, a large, powerful ferry — a veritable ice-crusher — plies in the service between the town of Mackinac, the Island of Mackinac, and St. Ignace, on the north shore. It is the well-known steamer *Algomah,* built in 1881, of four hundred and eighty-six gross tons, and one hundred and forty feet in length by thirty-three feet beam. Through storm and gale, which are prevalent in the straits at all seasons of the year, the stanch steamer runs back and forth over the profitable route. In the depth of winter, when the ice in the straits is often piled high and badly windrowed, the *Algomah* is useful in keeping the channel open for the car ferries, which connect the north peninsula railroads with those of the mainland operating to the south.

CHAPTER XVI

THE RAILWAY TRANSPORTS

Two Classes, River and Lake Transports — Descriptions of River Transports — List of Traffic Carried by Them — Difficulties of Winter Navigation — Delays to Limited Trains — Description of Lake Transports — Lines — Distances across Lake Michigan — List of Vessels in this Service — Coal Trade across Lake Erie — The Transport *Ashtabula* — Dangers of Ice and Gales.

THE big car ferries of the Inland Seas, which operate the missing links in almost a score of trunk lines of the iron trail, are of two classes, — those for river service and those built especially for the lake routes. The original car transports, which were of the former class, appeared in the seventies, and were the outcome of the intense rivalry of the railroads to secure the greater share of the rapidly increasing commerce of the Middle West. Unloading merchandise from the cars, the ferrying, and reloading it on the other side was a slow and expensive method, and the time came when the traffic of the Michigan Central could no longer be handled profitably by breaking bulk at the hiatus of the Detroit River. Bridging the straits or rivers connecting Lake Huron with Lake Erie never was deemed feasible, and tunnelling the beds of the streams was not advocated until years after.

To load the cars, therefore, on large and powerful steamers and transport them across the narrow river was then the only practical means of overcoming Nature's handicap, and such service has been maintained in winter and in summer for many years. The Canada Southern Railroad, which had been extended from Amherstburg,

near the mouth of Detroit River, to Buffalo and Niagara Falls, formed the eastern outlet of the Michigan Central, and, to connect with it the latter constructed a short branch line out and across Stony Island to deep water in the river. Plying back and forth between the terminal slip docks the big black transports carried hundreds of loaded cars and thousands of passengers daily. A number of years later, when the Michigan Central absorbed the Canadian road, a direct cut-off was constructed from Essex to Windsor, and the ferry route changed from that port to Detroit, the original ferry line being abandoned.

The river transport, like other craft intended for quiet waters, is constructed with low freeboard and clear decks, and all the machinery is placed low in the hull entirely beneath the main deck. This leaves the main deck unobstructed for the three or four tracks which run lengthways of the vessel. The cars are shunted on the steamer from connecting tracks on the slip dock, or hauled off, just as switching is done on the tracks in the yard. When a train of cars is loaded on, the farther ends of the sections at the stern of the transport are held by strong bumpers, while the open or dock ends are chained fast and blocked so as to be immovable while the steamer is under way.

In the loading and unloading of a transport an apron at the extreme end of the slip dock is used, on which the tracks run to make a secure and strong union with those on the vessel. To provide for the constantly fluctuating levels, as the weight added to or withdrawn from the transport, brings it down or raises it in the water, a system of powerful balance arms is employed. The apron hangs from one end of these arms, while from the other end are counterweights aggregating forty tons. The whole mechanism is controlled by electric machinery, so that by the touch of a lever the outer end of the apron is raised or lowered to the level of the vessel's deck, the inner end working on rockers. The

loading and unloading from different tracks may progress at the same time.

The fleet of ten car transports on the Detroit River comprises:

MICHIGAN CENTRAL

Transport	797 tons	265 × 45,	built in 1880
Michigan Central	1,000 "	276 × 45 "	" 1884
Transfer	1,060 "	278 × 75 "	" 1888
Detroit	1,307 "	308 × 64 "	" 1904

GRAND TRUNK

Huron	1,052 tons	250 length,	built in 1875
Great Western	1,080 "	232 "	" " 1866
Landsdowne	1,571 "	306 "	" " 1884

CANADIAN PACIFIC

Ontario	1,615 tons	308 length,	built in 1890
Michigan	1,615 "	306 "	" " 1891

PERE MARQUETTE-WABASH

Pere Marquette No. 14	1,655 tons	350 × 52,	built in 1904

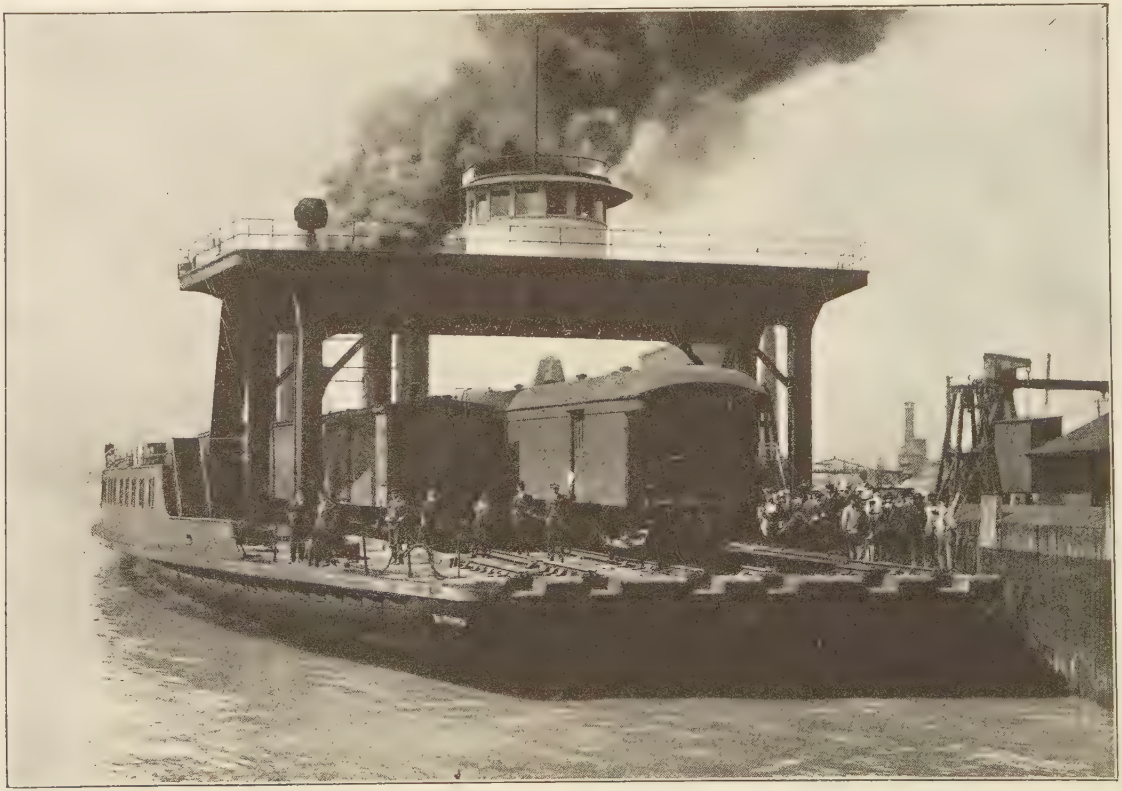
All of these transports are of iron or steel excepting the *Great Western*, built in 1866. In addition to this fleet the Pere Marquette line operates the transport *International* on the St. Clair River between Port Huron and Sarnia. With one exception this steamer is the oldest ferry now in service, having been built in 1872. It is of iron, two hundred and twenty feet in length, and of eight hundred and fifty tons' register.

The ten transports at Detroit average for every hour of every day in the year about six round trips, and as the distance is from one to two miles, according to the location of the terminal docks, they travel in the aggregate during the twelve months as far as three times around the earth. Originally they carried twenty-four cars in a passage, but railroad equipment has so increased in size

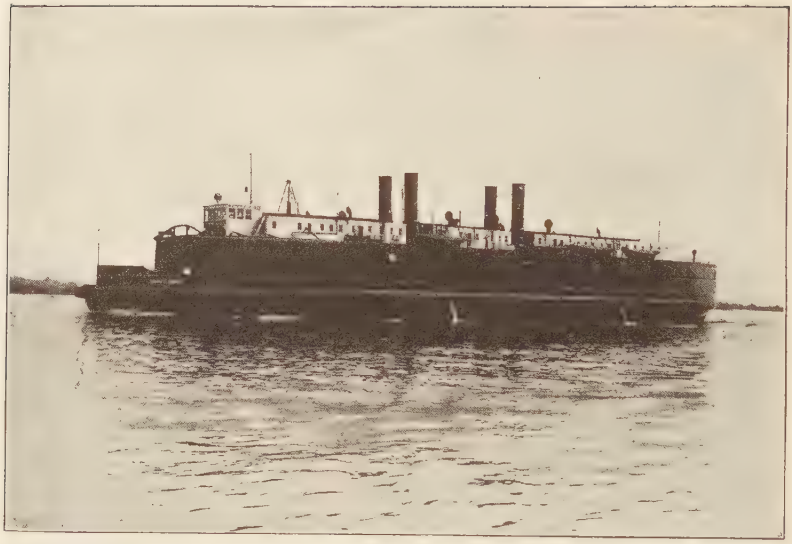
of late years that (the cars now built being twenty per cent longer) they can take on only about eighteen or twenty cars, as they now run in a train. All of the cars ferried are not loads, however, as the bulk of the traffic is eastbound, and many cars are returned to the West empty. A nearly accurate estimate of the loads on the basis of six hundred and fifty thousand cars at an average of forty tons each, gives twenty-six million tons transported across the river in a year. In 1907 the Michigan Central transports made exactly twenty-seven thousand, four hundred and seventy-nine trips, and carried four hundred and forty-eight thousand, one hundred and thirty-six cars.

Besides the tremendous freight traffic of the trunk lines, from twenty-five to thirty-five limited and express trains are ferried across the river every twenty-four hours. The operation of cutting a "limited" in sections, switching them on the transport, ferrying across the river, reswitching and connecting up of the sections, and shunting into the passenger station, requires from thirty to forty minutes. Travellers, as a rule, find the train ferry across the busy river, which looks so peaceful and blue, a pleasant incident in their journey, and reluctantly lose sight of the picture of marine activity, as a fresh locomotive hooks on the train and speeds it on its way. The ferrying of freight trains is not so expedited, however, and from two to three hours are required for live-stock, dressed beef, and other perishables, while from five to twelve hours' delay occurs for bulk freight. Expediting the ferrying of the passenger and express traffic, as well as the perishable freight, only delays the regular shipments the more.

The powerful transports are able to maintain regular service during the Winter because they are so constructed as to be most formidable ice-crushers. Their prows are so shaped that they plough through ordinary ice fields as if the thick ice were nothing but paper. But in the depths of Winter the river is often blocked with ice, sometimes in solid fields to its bed, and again in great



CAR TRANSPORT *DETROIT* DRAWING OUT OF SLIP



FERRY *SAINTE MARIE*, STRAITS OF MACKINAC

CAR TRANSPORT *TRANSFER* AT DOCK

banks of jagged, grinding blocks. At such times the transport is forced up on the high irregular field, and by its very weight crushes and forces the ice beneath its bow. Progress under such conditions is slow and laborious, and when the passage is impassable, a transport forces its way miles down the river and wallows about until it has formed a huge air hole. Then it climbs the side of the ice floe or jam and loosens it. In this way a strong current is created in the river, the obstruction to navigation is carried away, and a free passage afforded the craft for perhaps a week. Unless the weather moderates the ice jam soon forms again and the channel must be cleared as before.

Sometimes an express or passenger train will be held in the stream for hours while the transport is fast in the ice, generally near the slip, as making the landing is the most difficult task of navigation of the ferries. In January, 1901, the transport *Michigan* with the Chicago-Montreal flier was stuck for ten hours so near the slip that a long plank would almost reach from the deck to the dock. There were more than a hundred passengers on board and the night was pitch dark. Captain Jenking worked the transport forward and back — forward and back — for hours, but the bank of ice remained firm. The passengers became much exercised at the long delay; they quickly cleared out the larder in the diner, and from engine room to pilot house, there rose a loud wail of indignation and fear. Finally, about daylight, the transports *Great Western* and *Landsdowne* managed to reach the imprisoned vessel, and their united efforts broke up the jam, and the *Michigan* was forced into her slip.

In order to avoid such delays so far as possible two of the transports are provided with additional power. One of these, the ferry *Transport,* besides the side paddle-wheels, has a bow propeller, and the *Detroit* has two propellers in the bow, in addition to twin-screws at the stern

for the main motive power. These extra screws are used only in winter to draw out the ice from the slips by the suction thus created, large blocks being whirled beneath the surface and away toward the stern in a surprising manner. The additional power is also a great aid in times of serious jams or when the transport is aground. This sometimes occurs in thirty or forty feet of water although their normal draft is only twelve to fifteen feet. It is due to slush ice which forms on the bottom of the vessel at the bow, and is hardened into a solid compact mass, much like the "heeling-up" of the snow on a horse's hoof. It accumulates as the bow is forced into the snow which covers the ice floes in the crushing process, until it is several feet in thickness. When a ferry runs aground from this cause it is helpless, and only the combined power of other ferries is sufficient to release it, sometimes after hours of delay.

But even in Summer the river navigation is not always free and uninterrupted. Fogs settle down over the stream at times and whatever craft are caught, anchor as quickly as their "hooks" can be dropped. The *Landsdowne* was once caught in a thick bank of fog, in the Summer of 1906, with a Wild West show aboard, and was held in midstream until eleven o'clock the next morning. Meanwhile the cow-boys and Indians raised a "circus" on board, threatening to shoot the pilot house and the whole crew into the river, and to scuttle the ship, unless they were landed in time to pitch their tents and form their parade. All the thundering expletives, however, failed to move Captain McGregor in his resolve to abide by the rules of river navigation, and remain in his safe anchorage.

The car ferries of the lake routes, which link the State of Michigan to the great Northwest, and the East, are of very different construction from the river transports. They are deep-hulled vessels of steel and of great structural strength, and with powerful engines they ply back

and forth across Lake Michigan, the Straits of Mackinac, and Lake Erie, in all kinds of weather, in winter and in summer. Like the river ferries they are ice-crushers, but of greater size and power. During two or three of the winter months the lakes are frozen in a solid sheet of ice for twenty or thirty miles from the shores, and in extremely severe winters the ice fields meet in mid-lake. To keep a channel open in the depth of winter, even for daily passages back and forth, is a hazardous undertaking for the hardy mariners. The frequent gales which sweep the lakes break up the fields into ice floes which, driven one way or another with great force, pile up in huge banks, often in the direct course of the transports and as high as their upper decks. At such times they free themselves only after repeated bucking of the shifting mass of ice, sometimes miles in extent, by running their stout prow up on the edge of the mass, breaking it down by their sheer weight, and ploughing through the ragged, grinding blocks of ice thus formed.

The main deck of the lake transports is given up entirely to car space. There are generally four tracks running lengthways of the vessel, but the loading and unloading end is at the stern, instead of the bow, as with the river ferries. The hull is built up about eighteen feet above this deck and extends to the extreme bow. The upper deck, which is fitted up with luxurious cabins, staterooms, dining-saloon, and all conveniences for the large passenger traffic crossing the lakes, gives the leviathan, from a bow view, the appearance of a package freighter. But, as it passes before one, the illusion is dispelled, as the ends of four sections of a through train are seen at the stern. Looking forward through the deck from the stern when the tracks are free of cars, the impression formed is of twin subways, dark and gloomy, double tracks in each, the bright rails of which are lost in the blackness of the bow, and a midship section between the subways given over to the funnels, engine vents, and passages. Above

the upper dack are the pilot house, officers' cabins, lifeboats, and other hamper of a passenger steamer.

In the Lake Michigan service there are in all thirteen of these huge car ferries. The largest fleet and the most important commerce route is that of the Pere Marquette with six splendidly equipped transports, five of which are uniform in size and power, and the largest on the lakes. In addition to these the steamship line owns four large freight and passenger steamers engaged in the salt and package freight business across Lake Michigan. The main lines, however, through which flows the bulk of the traffic, are Ludington, in Michigan, and Manitowoc, Milwaukee, and Kewaunee, on the Wisconsin side. Another route is in operation between Muskegon and Milwaukee, while passenger steamers ply between Ottawa Beach and Milwaukee. The principal freight traffic is eastbound, and consists of grain, flour, malt, canned goods, fish, lumber, and general merchandise, destined for various points in the Eastern States. On the return trips the cars are laden with numerous products of the East, principally manufactured goods, coal, steel, structural materials, cement, besides furniture, automobiles, drugs, stoves, and brass-finished goods made in the industrial centres of Michigan. The routes vary in length from sixty miles to Manitowoc to ninety-five miles to Milwaukee, and a transport averages a round trip, including loading and unloading, in twenty-four hours. They carry thirty loaded cars on a single trip averaging forty tons each of merchandise, and during the regular navigation season a full complement of passengers. They are profit producing factors of the trans-Michigan railroad, aside from their chief value as feeders.

The Ann Arbor Railway line operates four transports from Frankfort, its western terminal, to Manitowoc and Kewaunee, in Wisconsin, and Menominee and Manistique, in upper Michigan. These transports, which with one exception are not so large and powerful as the more

modern steamers, cover routes from sixty-six to ninety miles long, carrying from eighteen to twenty-four cars in a single trip. A tri-weekly service is maintained during the navigation season from Frankfort to the upper Michigan ports named, and Kewaunee, and a daily service from Frankfort to Manitowoc throughout the year. The traffic of this line consists of very much the same commodities as the Pere Marquette. Still farther north the Grand Rapids and Indiana Railroad operates one transport between Northport and Manistique, a distance of about seventy-four miles. It is of the largest type of car ferry, and during the navigation season, makes trips as often as the traffic warrants.

Between Grand Haven and Milwaukee is the route of the Grand Trunk Railway line, which, besides a number of stanch passenger and package freighters, operates one transport. The distance is eighty-four miles, and daily trips are maintained by all steamers. The Lake Michigan Car Ferry Transit Company operates two transports of large size between Chicago and ports up the lake. Michigan City, St. Joseph, and Benton Harbor, and South Haven are other important ports on the east shore.

Coming down the lakes there are found at the Straits of Mackinac, two car ferries operated by the Mackinac Transportation Company. They connect the upper Michigan railroads with the Michigan Central and the Grand Rapids and Indiana railways in an important north-and-south traffic. Passenger trains as well as freight are transported across the straits between Mackinaw City and St. Ignace, a distance of about five miles, and the business is heavy at all times of the year.

The car transports of the lakes, classified according to the lines operating them, are:

ON LAKE MICHIGAN

Pere Marquette

Pere Marquette	1,634 tons,	350 × 56,	built in 1896
Pere Marquette No. 16	1,317 "	300 × 53	" " 1895
" " " *17*	1,685 "	350 × 56	" " 1901
" " " *18*	1,722 "	350 × 56	" " 1902
" " " *19*	1,548 "	350 × 56	" " 1903
" " " *20*	1,495 "	350 × 56	" " 1903

Ann Arbor

Ann Arbor No. 1	563 tons,	274 × 53,	built in 1892
" " " *2*	572 "	278 × 53	" " 1892
" " " *3*	272 "	272 × 52	" " 1898
" " " *4*	1,317 "	300 × 53	" " 1902

Lake Michigan C. F. Transit Company

Car Ferry No. 1	1,463 tons,	320 × 44,	built in 1895
" " " *2*	1,462 "	320 × 44	" " 1895

Grand Rapids and Indiana

Manistique, Marquette, and *Northern No. 1*	1,755 tons,	350 × 56,	built in 1903

Grand Trunk

Grand Haven	1,678 tons,	320 × 54,	built in 1903

Mackinac Transportation Company

Saint Marie	678 tons,	300 × 53,	built in 1893
Saint Ignace	600 "	230 × 52	" " 1888

ON LAKE ERIE

Marquette-Bessemer Dock and Navigation Company

Shenango No. 2	1,320 tons net,	300 × 53,	built in 1895
Marquette and Bessemer No. 1	998 " "	256 × 42	" " 1903
" " " " *2* *	1,484 " "	350 × 54	" " 1905
Ashtabula	1,722 " "	350 × 56	" " 1906

* Lost, December, 1909, with all lives.

The car transports on Lake Erie are engaged exclusively in the coal trade which originates in the Ohio and Pennsylvania coal fields, and reaches out to all points in Canada and the Northwest. Several routes are operated from Conneaut, Ohio, to Port Dover, Port Stanley, and Rondeau, on the Canadian side, in which the Pere Marquette with its line across Ontario to Sarnia and Michigan and thence to the Western States, largely enters. The transport system was introduced on Lake Erie in 1895 by the *Shenango No. 1* and the *Shenango No. 2*, which were ice crushers of three thousand, five hundred horse-power, and with a car capacity of twenty-six. The *No. 1* burned at Conneaut in 1906. In 1904 another type, which is not of the transport class, was built and placed on the coal route between Conneaut and Rondeau. Instead of the cars being transported across the lake, they were run on the vessel, and their contents dumped through the hopper bottoms and the open deck, into the hold. Ten cars can be unloaded by this method in less than a minute, and the cars drawn off. The *Marquette* and *Bessemer No. 1* can carry two thousand, five hundred tons net of soft coal in the bulk. Upon arrival at port across the lake, four grapple unloaders remove the cargo in eight hours. The loss of time and the expense of unloading is partly offset by the greatly increased carrying capacity, which is more than double that of the other method.

The latest route was established in 1906–7 from Ashtabula, the world's largest ore-receiving port, to Port Burwell, in Canada, by the new transport *Ashtabula,* the best equipped vessel of its class on the lakes. It is in advance of other transports in being constructed with water bottom, ballast tanks, and eight transverse water-tight bulkheads of steel. Six of these bulkheads extend to the main or car deck, and two to the lower deck. The water in the compartments is easily controlled by ballast pumps, and by filling some and emptying others, the trim of the

vessel is so governed as to materially aid in the progress through ice and in gales. The transport is propelled by twin screws, driven by two triple-expansion engines with cylinders nineteen and one-half, thirty-one, and fifty-two inches in diameter by thirty-six inches stroke. Steam is supplied under high pressure by four Scotch boilers. To expedite the service of this huge transport, new cars were constructed, thirty-eight feet long, and of sixty tons' capacity. Thirty of these cars are carried in a single trip. The transport easily makes two trips back and forth every twenty-four hours. In its official test it covered the distance to Port Burwell and return in nine hours and twenty-five minutes, at an average speed, under load, and with a sea running, of fifteen and one-fourth miles an hour. This is the record for car ferries on the lakes.

When any of the lake transports leave port in winter, if for no more than a few hours' run, they are always supplied with a full stock of provisions sufficient for at least three weeks. This is to provide for an emergency in case the ferry is frozen fast in the ice floes *en route*. Many instances are recalled when a transport was imprisoned for days at a time in a seemingly impassable barrier of solid ice, piled up in hummocks and badly windrowed. It floated about with the ice field as the wind drove the huge mass about the lake, and sometimes only a moderation of the weather or change of wind weakened the ice so that the steamer could release itself. In such cases members of the crew often walk ashore on the ice.

Another great danger to the car ferries is the difficulty of making port in gales, when the short, choppy seas raised on the lakes sweep over the breakwater of the harbor. Many times the captain is obliged to "lay to" out in the lake for the gale to blow itself out, not daring to venture into the comparatively narrow entrance of the harbor. One of the largest transports on Lake Michigan went ashore when under full load, in the Fall of 1908, and for nearly a week the combined power of two or three

of her sister ships was not sufficient to pull her off. A fortunate shift of wind and a rise in the lake level released her one night, and she drifted away some distance before the wreckers were aware of what had happened. There are many thrilling experiences in the lives of the sturdy mariners of the Inland Seas, but none can equal those which the transport service involves.

CHAPTER XVII

THE ERA OF STEEL AND THE PACKAGE FREIGHTERS

Evolution of Steam Barge to Wooden Steamship — Large Cargo Capacity — Davidson Fleet — The Advent of the Whaleback — Its Construction — Importance of Small Freighter — Needed for Traffic of Lesser Ports of Shallow Channels — Boutell Barge — Anchor Line Steamers — Western Transit Company — Mutual Transit Company — Lehigh Valley — Inter-Lake Commerce by Welland and St. Lawrence Canals — Vessels in this Service — Decline and Reasons for It — Steel Canal Boats, Cleveland to New York.

COULD Henry Hudson come back in the flesh to compare his *Half Moon* with the stately vessel which bears his name; could John Paul Jones likewise appear to recall his cherished *Bonhomme Richard* before the modern battleship *Delaware;* or could Robert Fulton with his famous *Clermont* in mind walk the decks of a turbine-driven Atlantic liner, their wonderment would know no bounds. Or could those early navigators of the inland waters come back to life to compare the *Griffin,* the *Washington,* the *Astor,* or later, since the beginning of the era of steam, the *Walk-in-the-Water,* or the *Vandalia,* with the splendid lake liners, the great fleets of passenger and excursion steamers, and the gigantic ore ships of to-day, they would realize what great strides have been taken in marine architecture during the last three centuries.

Scarcely less remarkable is the transition from wood and iron to steel, as applied to a peculiar and distinct type of vessels engaged in the general merchandise trade along the chain of Great Lakes. The evolution of the lake carrier presents some features of unusual interest. The incentive to enlargement and improvement of service

respecting speed and safety lay in the ever increasing volume of trade in the lakes region and the consequent traffic offered the water highways. As has been shown, steam navigation was introduced at a time when the requirements of commerce were easily accommodated by the then prevailing type of sailing vessel. A little while after, the tide of immigration into the West created greater demands in the way of expedition, which brought about a wave of shipbuilding. This new shipping was largely of the steam-propelled type, and gradually the slower going and uncertain sailing vessels were driven out of the immigrant and merchandise trade, and found a place in the carrying of bulk or coarse commodities, such as salt, lumber, and wood.

As the years went by the big side-wheelers operated by the railroads and independent lines were crowded out of the increasing trade by the slower propellers, due to their greater carrying capacity in proportion to their tonnage, and less expense of operation. Then came the era of iron and the construction of a number of large, stanch, and luxurious steamers, as viewed by seafaring men of the time, the early seventies. The cost of iron vessels was much greater than those of the same size and capacity built of stout wood, for oak and other timber was then abundant throughout the lake region, and all the shipyards were equipped for such work and the experience of many years lay back of it. For these reasons the next step in the evolution was the big wooden steam barge that carried from one thousand, two hundred to one thousand, five hundred tons in her hold, and towed a sailing vessel in her wake.

This type was followed in the late eighties and in the nineties by the fine wooden steamship and consorts of large capacity, such as are of considerable importance in the lake shipping to this day. Steamers and schooners of this type were built as late as 1903, at which time the supply of oak timber suitable for ship material became

practically exhausted, and the price which it commanded rendered further shipbuilding from wood on the Inland Seas, an industry of the past. For many years the shipyard of James Davidson, at Bay City, was one of the largest and best for such construction on fresh water. After the demand for new tonnage of wood had ceased along in the nineties, the yard still continued building the largest wooden vessels ever built anywhere, and to-day the Davidson fleet of fourteen vessels is the best of its class afloat upon any waters of America.

All the vessels of this fleet were built within the ten years next after 1893, and comprise seven steamers, seven barges, schooner rigged, and three tugs. Five of the steamers and four of the barges are in the three-hundred-feet class or larger, ranging in size from three hundred and twelve feet length and forty-four feet beam to three hundred and seventy-eight feet length by forty-six feet beam, and registering from two thousand, two hundred to two thousand, eight hundred tons, with a large cargo capacity of about five thousand tons each. The entire fleet measures nearly thirty thousand tons, which gives a capacity exceeding fifty thousand tons in a single trip. The barge *Montezuma,* three hundred and seventy-eight feet in length and forty-six feet beam, is probably the largest wooden vessel ever built and launched in fresh water.

Besides this fleet there are upward of one hundred steamers and about ten barges of wood in the classes measuring two hundred and fifty feet in length and over, many of which are nearly three hundred feet, and of forty-two to forty-four feet beam, all owned and operated by small independent lines, and may be termed "tramp ships." They are engaged principally in the grain and coal trade between the head of the lakes and Buffalo or other Lake Erie ports. While the old steam barges and the small schooners, some of which date back to sixties and seventies, are fast disappearing from the lakes ma-

rine, the stanch wooden ship will likely continue a factor in the carrying trade for a number of years to come.

The era of steel shipbuilding was heralded by the appearance of cigar-shaped vessels, known as "whalebacks" or "pigs," which constitute the most picturesque oddity of the fresh-water fleet. The type was invented about 1889 by Captain Alexander McDougall, and within five or six years forty-five such vessels comprising both steamers and barges were built at Duluth. They were designed primarily for the ore-carrying trade, and derive their name from the fact that their main deck of steel is rounded off at the sides, very much resembling the back of a whale. The ore cargo can be stored away very snugly in the cylindrical-shaped holds, and with hatches bolted down and rendered water-tight, the vessels are seaworthy to a remarkable degree and will outride any storm or gale. For this reason it was at first believed that the whaleback would come into general use in the ore and coal trade, but these expectations have not been realized.

About the time of the opening up of the Mesaba Range in Minnesota, the whaleback company took a fifteen years' contract to carry the ore to Lake Erie ports, and the shipyard was turning out two or three vessels a month. But the Rockefeller interests in the company became dominant, the contracts, patents, and everything else were secured, and the fleet tied up. While they were fighting the Carnegie Company the loss was at least four million dollars, which represented the money the fleet would have earned had it been continued in commission under the contract. After this a few whalebacks were sent to the Atlantic Coast where they are engaged in the coal trade. As they were too long to enter the locks of the Welland Canal, they had to be cut in two, taken through the canal in sections, and put together at the Ontario end. They rode the rapids of the St. Lawrence safely; and in the Dominion cities and those on the Atlantic Coast, they

created no end of wonderment and suffered much derision by the salt-water "tars," who never have respect for anything that floats on fresh water, which to them is not fit to navigate.

When the war of the competing iron and steel interests was ended by the formation of the United States Steel Corporation, and the absorption, with the other properties, of the ore-carrying fleets owned by the various steel companies, there were about twenty-five whaleback steamers and barges in the vast fleet thus formed. They were a distinct and homogeneous fleet of themselves, although of different sizes and tonnage. Some of the steamers were in the three hundred feet class, towing barges one hundred feet longer, and carrying nearly double their cargo. The tendency every year was toward larger and faster steamers, and by 1896 the whaleback had increased in size to four hundred and thirty feet in length by fifty feet beam, and twenty-seven feet depth, of carrying capacity about nine thousand tons on twenty feet draft. Although no more whalebacks were built after that time, there are about forty still in commission on the lakes, chiefly in the ore trade.

The construction of the whaleback is a radical departure from the well established methods of shipbuilding, but even greater strength and rigidity has been attained than in the usual type of vessel. As a first consideration the keel and bottom are carried upward from a point seventy-five to one hundred feet forward, on an easy curve, and terminate in a round "snoot," well above the water line on load draft. About thirty feet back of this there is a low turret, the top of which is a convenient and safe vantage point for the lookout in rough weather. Within the turret are housed the steam capstan and other small gear required at the bow. The long stretch of deck is clear for the numerous hatches which expedite the loading and discharging of the cargo, a feature of the utmost importance in present-day methods of waterway traffic.

The engines and boilers, including coal bunkers and auxiliary machinery, such as steam steering gear, pumps, winches, and electric lighting plant, are placed in the extreme stern, behind a water-tight bulkhead of steel, thus forming for it a separate compartment. Above the main deck and supported by another turret is the wheel house and chart room. The smoke funnel and piping passes through the turret; and back of it are the crew's quarters, and galley, while above on the upper deck are the captain's and others officers' cabins.

Besides these cargo vessels one whaleback passenger steamer was built — one of the largest of that class ever built on the Inland Seas. This is the *Christopher Columbus*, of World's Fair fame, which during the Summer of 1893 carried one million, seven hundred thousand passengers between Jackson Park and the down-town wharfs. Built at Duluth during the preceding year she came to Chicago new and fresh and resplendent with all upper works of a glistening whiteness, and proved one of the wonders of the exposition. Designed especially for the exacting service, which in the short trip of six miles demanded that throngs of people be taken on and disembarked many times every day, the decks and stairways can handle immense crowds, and fully five thousand have been unloaded in five minutes.

In this age of progress and growth of transportation facilities the enlargement of ships has gone on apace, and the importance of the small steamer of one thousand to one thousand, five hundred tons' burden has almost been overlooked by the vessel owners. As the old steam barge and their tows drop out of service, one by one, there is practically nothing being built to replace them. In many divisions of commerce they will never be missed or again needed, but, on the other hand, there are some coarse freights, such as salt, stone, and products of the forest that will never be carried by the big steamers. From their very size and tonnage they are barred from

such business, not only by the limitations of the navigable channels of the lesser ports, but also by the small volume of the trade which can be done at one time in such ports. And, in the majority of cases, where a profitable cargo might be taken in, there would be nothing to offer for a return cargo, and in such traffic this is an all-important consideration. The time is not far away when steel steamers, possibly somewhat of the old barge type, will be built for the business of the smaller places which demand recognition as lake ports. With the completion of the Erie Barge Canal, about 1915, such vessels of load draft not exceeding twelve feet, would be able to pass from any of the ports on the lakes to the Hudson River and thence to New York and the sea coast.

A type of vessel peculiarly adapted to this service is the unit of the fleet operated by the Boutell Steel Barge Company. This little fleet is most homogeneous, being composed of four steamers and eight barges (two barges to the tow) aggregating fifteen thousand tons' register. The vessels are of uniform size, two hundred and seventy-six feet in length by thirty-six and thirty-eight feet beam, and the barges have a cargo capacity of nearly three thousand tons each. They were built from 1889 to 1901, and are still very profitable carriers.

During the last decade the lake commerce has more and more resolved itself into classes and distinct divisions, and the old lines, in both the merchandise and passenger traffic, have strengthened their hold upon public favor and patronage. To accomplish this and earn the good will of travellers bent on business or pleasure, they have greatly improved the service. They have added new and faster steamers to their well established routes, and in many ways made waterway travel safer and more enjoyable. The railroad liners, which are confined to the merchandise trade almost exclusively, transport several million tons during the navigation season. It is all high class freights, originating in the vast territory of

THE *CHRISTOPHER COLUMBUS*

Photo by N. L. Stebbins

THE *NASHVILLE*

the Northwest and destined for the populous districts of the Atlantic Coast, or equally valuable commodities manufactured in the busy centres of New England to supply the ever increasing demand of the West.

Of these railway fleets the Anchor Line is the oldest and most popularly known throughout the lakes. It is the operating line of the Erie and Western Transportation Company, which in turn is owned and controlled by the Pennsylvania Railroad. It is composed of fifteen iron and steel steamers, aggregating thirty-seven thousand, five hundred tons' register, and over sixty thousand tons' cargo capacity. The oldest vessels of the fleet are the *Japan, India*, and *Alaska*, built in 1871, which were the first liners constructed of iron. They were elegantly fitted up for the accommodation of fifty passengers each, and many travellers have had their first view of the lake ports from the decks of these stanch and safe propellers, as they are classed. They were followed in 1880–81 by larger steamers, the *Clarion* and *Lehigh*, of one thousand, seven hundred tons' register, and measuring two hundred and fifty-six feet length by thirty-six feet beam; and in 1886 by the *Susquehanna*, a leviathan of the time, being three hundred and twenty-four feet in length by forty feet beam, registering two thousand, eight hundred tons. In 1892, the sister ships, *Codorus*, *Mahoning*, and *Schuylkill*, built of steel, three hundred feet long by forty feet beam, and of two thousand, two hundred tons' register, were added to the fleet. Ten years later the *Muncy*, of nearly three thousand, nine hundred tons and measuring three hundred and seventy feet length by forty-six feet beam, was built; and in 1903 the splendid *Tionesta* added much to the prestige of the line. She is a combined passenger and freight steamer, three hundred and sixty feet in length of deck and forty-five feet beam, and registers four thousand, two hundred and fifty tons. By 1905 the sister ship, the *Juniata,* had appeared to further increase the popularity of the lake voyage; and at the same time the great

freighter *Delaware,* three hundred and seventy-six feet in length and fifty-six feet beam, of three thousand, nine hundred tons' register, was added. In 1907 her sister ship, the new *Wissahickon*, was put in commission. The steamer *Clarion* was burned on Lake Erie in the great gale of December 7 to 10, 1909.

The Western Transit Line operates a fleet of sixteen package freighters between Buffalo and Chicago and Buffalo and Duluth, carrying in the aggregate sixty-five thousand tons of merchandise in a single trip. The old steamers date back to 1870, from which time to 1879 the wooden vessels, *Rome, Commodore, Auburn,* and *Yonkers,* carried all the business offered. They were nearly uniform in size and tonnage, being two hundred and sixty-five feet in length, with a width of thirty-six feet, and one thousand, eight hundred tons' register. In 1880 and 1884, the iron steamers *Boston* and *Syracuse,* of about the same dimensions, were added to the fleet; and in 1893 the *Mohawk,* three hundred and twelve feet in length by forty-one feet beam, and of two thousand, three hundred and fifty tons' register, was built. By 1899 vessels of this type had so increased in size that the *Troy* and the *Buffalo,* four hundred feet length of deck and fifty feet beam, and of four thousand tons, greatly increased the carrying capacity of the line. The steamers *Chicago, Milwaukee,* and *Utica* are sister ships, three hundred and forty-five feet long by forty-four feet beam, and of three thousand, five hundred tons' register; and the *Duluth*, of four thousand, six hundred tons, is even larger than the *Troy* and *Buffalo.* The *Superior,* built in 1905, is the latest addition to the fleet and is of about the size of the *Duluth.* In all, the fleet is an important factor in the movement of line freights.

The Mutual Transit Company, which controls the Union Steamboat Line, is the operating concern for the lake fleets of the Great Northern and Northern Pacific Railways. It is composed of fifteen vessels well suited for the upper lake

trade. Some names given these liners are unique, such as *North Wind, North Star, Northern Wave, Northern Light, Northern King,* and *Northern Queen.* They are each of two thousand, four hundred and seventy-six tons' register, and measure three hundred and twelve feet long by forty feet beam, and were built in 1888–89. The *North Star* was lost on Lake Huron in November, 1908. Other vessels of the fleet range in size from three hundred to three hundred and forty feet length by thirty-eight to forty-four feet beam, and register from two thousand to three thousand, four hundred tons, being built in the eighties and nineties. The total cargo capacity of the fleet is nearly seventy thousand tons. In 1909 three new freighters were added to the fleet, the *North Sea,* the *North Lake,* and the new *North Star,* being of dimensions three hundred and seventy-two feet length, forty-six feet beam, and registering four thousand tons.

Another important line is that of the Lehigh Valley Transit Company, which numbers six large freighters of steel. It is a homogeneous fleet, composed of but two different classes of ships. The first class, built in 1888–90, comprises the *Bethlehem, Saranac, Seneca,* and *Tuscarora,* of two thousand, six hundred and sixty-nine tons' register, and measuring three hundred and ten feet length by forty feet beam. The later class, added in 1901, is composed of the *Maunch Chunk,* and the *Wilkes Barre,* of four thousand, five hundred tons, being four hundred feet long by fifty feet wide. They ply between Duluth, Chicago, and Buffalo in connection with the Lehigh Valley Railway, by which they are owned.

Almost since the beginning of permanent settlement of the St. Lawrence country, there has been some traffic from along the great river and the Ontario shores to the upper lakes. At first it was no more than bringing into the settlements canoe and boat loads of furs from the vast region of the Northwest, and the carrying of supplies and trinkets to the trading-posts in return. The

rapids of the St. Lawrence and the falls of Niagara were overcome by portage, but even then some better means of surmounting the obstacles placed by Nature to a free navigation were deemed necessary by the sturdy pioneers. They must have realized the possibilities of the great chain of waterways as a mighty highway of commerce to the South and West.

Although some small canals and locks along the St. Lawrence were completed by the Royal Engineers as early as 1783, nothing was done toward a passage of Niagara until 1816. After overcoming many difficulties and financial troubles, the Dominion Government completed the first Welland Canal in 1829. As commerce increased by the natural demand of a growing population in the upper lake settlements, larger vessels were built for the interlake traffic, and enlargement of the Welland was twice made until the present scale of navigation was determined on, in 1871, and completed in 1887. The canals and locks of the entire system from Lake Erie through to Montreal provide for vessels of maximum dimensions, two hundred and fifty-six by forty-four feet, which may load to a mean draft of fourteen feet.

Even with this moderate navigation afforded from the head of the lakes to the sea, it was not long before it was found to be entirely inadequate to establish a great and enduring traffic. The bulk of the eastbound commerce was made up of grain, flour, salt, and lumber, and the vessels engaged in such trade were soon too small to compete profitably with the much larger grain ships which used the port of Buffalo as their eastern terminal. To retain as much of the trade as possible some novel means were resorted to. The limit of fourteen feet draft imposed by the Welland and other canals was less by a foot or more than the maximum draft, when fully loaded, of the vessels which could navigate them. This was a severe handicap to the successful operation of many steamers, but since the harbors at both ends of the Welland Canal

afforded sufficient depth of water to float them when fully loaded, they were given their maximum cargo.

To permit the passage through the canal when under an increased draft, lightering was quite generally adopted. The Grand Trunk Railway built a branch line parallel to the canal, with elevators and switching tracks at each end. Enough of the cargo was transferred to the railroad and transported overland to bring the vessel to the fourteen feet draft and thus enable it to pass through the canal, when, at the other terminal, the transferred portion of the cargo was taken on again. This expedient worked fairly well until about 1898, when the greatly reduced rates rendered the inter-lake traffic unprofitable. The smaller vessels had already been crowded out of the trade and the transfer charges were prohibitive to the larger ones.

In 1907 only ninety-three vessels lightered through the canal, of which sixty-three were Canadian steamers and one schooner. Eighteen vessels entered under the British flag, and ten steamers and one schooner under the United States standard. The Canadian steamer *Iroquois* was the largest, having a registered tonnage of one thousand, four hundred and fifty-two, and dimensions two hundred and sixty feet length, forty-three feet beam, and twenty-six feet depth of hold. On August 3, she arrived at Port Colborne from Fort William, with one hundred and two thousand bushels of wheat destined for Kingston. The draft was sixteen feet, five inches, fore and aft, and the dead weight of the cargo was three thousand and sixty-one tons. In order to bring the steamer to the required draft, twenty thousand, six hundred and ninety-six bushels, weighing six hundred and twenty-one tons, were lightered, which amounted to twenty car loads, comprising a small train.

The *Iroquois* entered the canal under a draft of fourteen feet, two inches, with eighty-one thousand, three hundred and four bushels still in her hold, and a tonnage of

two thousand, four hundred and forty, and steamed through, reloading the transferred grain at Port Dalhousie. The cost of lightering was two cents a bushel, amounting to $413.92. The total tonnage of lightered vessels through the canal in 1907, was 179,043, while only two thousand and seventy-two tons of grain was discharged at Port Colborne by vessels which did not enter the canal.

Notwithstanding the fact that the bulk of the grain shipments goes to Buffalo, there are several lines operating steamers between Ogdensburg, Kingston, the Ontario ports, and Chicago, and upper lake ports. Of these the Great Lakes and St. Lawrence Transit Company has nine steamers built specially for this service. The vessels are of uniform size and tonnage, registering one thousand, six hundred and fifty tons, and measuring two hundred and fifty-five feet in length by forty-one feet beam, and were built in 1903. Their cargo capacity is two thousand, five hundred tons each on the fourteen feet draft. Next in importance is the Rutland Transit Company, which operates six wooden steamers of an aggregate tonnage of eleven thousand, three hundred. Two of them are two hundred and fifty-six feet length by thirty-seven feet beam, and of one thousand, six hundred tons, and were built in 1884. The other four are of forty-two feet beam, and two thousand and fifty tonnage, built in 1889–90. Their cargo capacity is the same as of the other line. Besides these vessels numerous "tramps" trade on these inter-lake routes, picking up what cargoes they can, and seemingly earning fair returns.

During 1907 the aggregate tonnage of all classes of vessels in this service was 1,614,132. They numbered nineteen hundred and eighty-two. Of this tonnage 396,743 passed from and to ports of the United States. The increased size of the vessels using the waterway is strikingly shown in a comparison with the report of 1867. In that year, fifty-four hundred and five vessels passed through

the Welland, carrying only 933,263 tons. The Canadian commerce through the canal to-day is very largely through freights passing eastward from Lake Erie ports to Montreal, and which amounted in 1907 to 789,167 tons. This was carried in a navigation season of two hundred and thirty-eight days; and in the entire year the Grand Trunk and Canadian Pacific Railways delivered at Montreal 383,735 tons of grain, against 684,697 tons of grain carried by the Welland and St. Lawrence Canals.

The tolls of the Welland Canal, which had been gradually reduced from time to time to equalize the schedules on the St. Lawrence, were taken off entirely in 1903. Since then all the Canadian and United States canals along the chain of the Great Lakes have been free, not only to the vessels of each nation in its respective canals, but also to the vessels of the other; and they are open to the world.

An innovation in the lake-canal traffic was introduced in 1895 by the Cleveland Steel Canal Boat Company, in an effort to establish a direct route from Cleveland to New York by way of the Erie Canal. It was a fleet composed of one steamer and five consorts — all steel canal boats — carrying in the aggregate one thousand, three hundred tons of steel rails. The trip was made in thirteen days, and at such a low cost that three other fleets of two feet greater draft of its units, or eight feet, were built and put in service the following year. The boats were ninety-eight feet in length, eighteen feet beam, and ten to twelve feet depth. They were built of three-eighths-inch open-hearth steel, and, being very buoyant, drew only eighteen inches of water, but loaded down to six feet draft, carried two hundred and thirty-five tons. The steamer was equipped with fore and aft compound engine of one hundred and twenty horse-power, and supplied with steam by a boiler of the Scotch type. The diameter of the screw propeller was sixty-four inches, making one hundred and

twenty revolutions per minute. The cost was fifteen thousand dollars, and that of each consort about six thousand dollars. While they were well adapted to and economical carriers on the canal, they were small and hardly suited to withstand the rough seas encountered in the long stretch of open lake between Cleveland and Buffalo, a distance of one hundred and seventy-six miles, and the through route was soon abandoned. The port of Buffalo is the natural and practical terminus of the eastbound lake marine, but the new Erie Barge Canal may, with its broad and deep channel, bring about economic changes not now foreseen.

CHAPTER XVIII

THE GREYHOUNDS OF THE UNSALTED SEAS

TYPES OF PASSENGER STEAMERS — THE *North West* — ROUTES OF THE NORTHERN STEAMERS TO UPPER LAKES — COMMERCE AT PORT OF CHICAGO — STEAMER *Manitou* — THE NORTHERN MICHIGAN TRANSPORTATION COMPANY — THE GOODRICH LINE — ITS HISTORY — STEAMER *Christopher Columbus* — THE *Theodore Roosevelt* — THE *United States* — ITS ELECTRICAL EFFECTS — WHITE STAR LINE — STEAMER ROUTES — INDEPENDENT STEAMERS AND ROUTES — CEDAR POINT ON LAKE ERIE, THE "CONEY ISLAND OF THE WEST."

THE highest type of water craft is the modern passenger steamer. It is the culmination of the shipbuilder's art. It represents the genius and skill of an army of steel workers, wood workers, and those of allied trades. Its interior reflects the taste and delicate touch of the artist and decorator. Its mechanical being and safeguards of life are as nearly perfect as can be devised. And its conveniences for the comfort and pleasure of tourists and excursionists bent on business or recreation are everywhere present.

It may be a gigantic liner swiftly ploughing the sluggish billows of the ocean or creeping cautiously into harbor. Or it may be a lake greyhound steaming over the more tranquil waters of a crystal sea or river. In either case it is a real and vivid exponent of the progress in mechanical science. It gives to the marine picture a touch of life, of movement, and of color which almost equals the charm of the old-time scenes in which the white-winged fleets of brig, bark, or schooner held the foreground. It suggests the intense activities of the waterway commerce and the feverish haste of multitudes in quest of fortune.

It is, indeed, the crowning feature of marine architecture of to-day.

Upon no inland waters of the world can there be found such a squadron of stanch, speedy vessels as plies the Great Lakes and their outlet, the St. Lawrence River. The great express steamers are built with special regard to the waters upon which they float, and the arrangement of deck and cabin space exactly meets the requirements of the service on the routes they cover. The greyhounds of the night lines are necessarily of very different plan from those of the daylight routes, while the excursion steamers and broad-decked ferries are radical departures from either. For clearness and perspective the fresh-water fleets of the Inland Seas may be divided into these general classes. The steamship companies generally adopt one particular type of steamer best suited to their service and adhere to it closely in their new ships. In some instances, however, the lines are composed of vessels representing two distinct types.

In the east and west travel by the highway of the great unsalted seas, the steamships *North West* and *North Land*, of the Northern Steamship Company, present a most interesting study. In point of size they may be placed in a class almost by themselves, and moreover, being exclusively passenger ships, carrying neither freight nor express matter, they are to the lakes what the limited trains are to the trunk lines of railway. Since 1894–95, when they were commissioned in service between Buffalo, Chicago, and Duluth, they have been the wonder of tourists from the home ports and from afar. They closely resemble a large type of Atlantic liners, and, indeed, it is hard to believe, upon seeing either in mid-lake or the connecting waterways, that some giant of the briny seas has not been transplanted into the fresh waters.

These splendid steamers are three hundred and eighty-six feet in length of deck, forty-four feet beam, and twenty-six feet depth, and register five thousand tons.

THE *NORTHWEST*

THE *J. PIERPONT MORGAN*

PASSENGER STEAMER *CITY OF THE STRAITS* IN DRY DOCK
AT DETROIT DOCKYARD

The hulls are of steel throughout and were constructed on the models of the swiftest liners, under a special survey to obtain the highest classification. They are not only modern and luxurious in every appointment, but in strength and safety are not inferior to the Atlantic liners.

On their profitable route to the West and Northwest, these steamers use a common path from Buffalo to Mackinac, which is the dividing point of the traffic destined for Chicago and Duluth. The beautiful island which is the gem of the straits has very aptly been called " the hub of the unsalted seas," and it is the Mecca of all tourists in the lake region. Leaving the port of Buffalo twice-weekly early in the evening, the traveller has a vivid view of the commercial and industrial activities of a large and thriving city. Off on the port side in the gathering darkness of night are shooting tongues of flame and the red glare of the furnaces, for the gigantic steel plants do not stop operations at the close of day. The sight is rivalled only by the lurid rays of the setting sun over the brilliant electrical display of Crystal Beach on the far Canadian shore.

The night voyage up Lake Erie brings the good ship by early morning off the city of Cleveland. Into the harbor and up the narrow stream she is led by tugs, until, at her wharf, the high buildings and the landmarks of viaduct and streets of Ohio's metropolis, show but dimly through the early haze and smoke. After a brief stop, for these great ships are operated on a fast express schedule, the steamer is drawn out of the river, and turning about, is soon clear of the harbor and rushing over the mid-lake pathway. Through the noon hour she is passing Point Pelee, that dangerous cape off the Canadian shore, and in an hour or so is entering the wide mouth of the Detroit River.

For twenty miles the ship steams under reduced speed through the most entrancing scenes of green banks, shaded woodland, and verdant farming lands to the very water's edge, and occasionally a small town or hamlet

adds a touch of slumbering rusticity. For some distance through Limekiln Crossing, the veritable "Hell-Gate of the Lakes," the vessel feels her way very cautiously, for the turns are sometimes tortuous and there are many craft of all classes passing in both directions. Through these straits the immense commerce of the lakes narrows in two processions of the vast merchant marine, which in the aggregate is nearly one-half of the total tonnage of the United States, and which needs no subsidy for its existence and extension. This, indeed, is the heart of the wonderland.

Detroit, the "City of the Straits," lies along the river front for nearly ten miles; and the first point of interest after passing the great shipyards, the alkaline chemical works, and steel plants, is old Fort Wayne which recalls stirring events in the War of 1812. It is still garrisoned by a regiment of United States troops. Wide and well-shaded streets smoothly paved, and lofty buildings of granite and marble are the distinguishing features of this old city of Detroit, the site of which was first visited by Antoine de la Cadillac in 1701. The parks alone have made it famous, and of these Belle Isle, the island park in the river, is "premier," for there is nothing like it — or so beautiful — elsewhere.

After a short stop the steamer continues on her way, passing Belle Isle on the port side and giving the travellers a splendid panoramic view of lagoons, driveways, greensward, and attractive buildings of artistic design. The upper end of the island is heavily wooded, and remains in nearly its natural state, adding greatly to its charm. Just above its head the river widens out into the expanse of Lake St. Clair, the waters of which though shallow are of the same crystalline clearness and purity. A run of about eighteen miles across the open brings the steamer to the entrance of the ship canal, which is a government work of some magnitude. Through this artificial channel at the delta of the St. Clair River, for more than a mile,

the vessel steams at slow speed, and then is in the more open stretches of the South Channel.

Along this natural though deepened stream for a distance of several miles lies the St. Clair Flats, a city built on the water — the "Little Venice." It is famous throughout the Middle West as the summer home of the devotees of aquatic sports, of which fishing, trapping, and hunting are the chief delights. The cabins and houses are built for the most part on piles, or mounds of sand thrown up by dredging, with numerous lagoons extending back into the marsh which surrounds the Flats for miles on all sides. It is a cosmopolitan colony of contented, nature-loving people, intent upon enjoying the simple life to its utmost. The unbuilt portion of the Flats along the east side of the river is an Indian reservation under the domain of Canada, and over which floats the Cross of St. George, while over the other waves the Stars and Stripes. A little further north, opposite Algonac, the Walpole Island Indians have a settlement where they make bows and arrows, baskets and other articles for trade at the resorts.

All along the channel are numerous docks at which the day boats stop to land and take on passengers and supplies for the summer city. There are pretentious clubhouses and inviting hotels with their little groves of willows, green lawns, and cool arbors. Countless water craft of the mosquito kind dart here and there almost under the bows of the passing greyhounds, the white and trim excursion boats, and the great ore ships. Still above these attractions is Tashmoo Park, owned and conducted by the White Star Line. Here all is not art, neither is all nature. The ground is covered with a dense grove, but there is also a fine athletic field, while shrubbery, lily ponds, and other natural attractions help to make it an ideal recreation resort.

A little further on the river stretches out into its natural bed through a most beautiful country. There are

broad fields of waving corn, small patches of woodland, the comfortable homes of the prosperous countryfolk, and green banks of the stream continually laved with the pure clear waters. For thirty miles new and ever changing scenes open up to the view of the traveller until, passing the thriving little city of Port Huron on the port side, and the slower town of Sarnia on the Canadian frontier, the steamer enters Lake Huron. She continues the voyage along the international boundary in mid-lake for nearly two hundred and fifty miles to Mackinac Island.

At this point the *North West* turns back eastward for about sixty miles to the St. Mary's River, threads its way through narrow channels, surmounts the famous locks, and comes to the tempestuous inland sea, Superior. For a night and a day she steams onward, touching at Houghton and Hancock, the centre of the great copper country; passes through the ship canal in the Keweenaw Peninsula, and arrives in another half-day at the head of the lake, the port of Duluth-Superior.

Here at the twin cities, with the harbor between, are new scenes of intense commercialism. The great ore docks are filling the cavernous holds of the giant freighters, other docks are discharging the return cargoes of coal for the great Northwest, while at still other docks great elevators are almost emptying their rich storage of grains into the lake monsters which hurry it to the ravenous hordes of the East. And then there are the immense lumber interests, and the feverish activity of a railroad distributing port, for this is the head of the Inland Seas navigation for the United States. The development of this rich and prosperous land of wonders almost equals the mavellous feats of Aladdin.

The steamer *North Land*, on the southern route to Chicago, bears off to the west from Mackinac Island, and, after a turn to the south, in about four hours enters Little Traverse Bay for the stop at Harbor Springs. Down the long expanse of Lake Michigan the steamer continues

for part of an afternoon and a night, and, in the early morning of the third day from Buffalo, arrives at Milwaukee, the "Cream City," situated on a high bluff towering above and overlooking a beautiful bay.

From Milwaukee to Chicago is a short run down the west shore of the lake, past the flourishing towns of Racine, Kenosha, and Waukegan, and then slipping by the picturesque suburbs of Chicago's North Shore. "Out upon the water front towers the big, splendid city, the metropolis of the Middle West, and, closer at hand, a succession of superb parks, facing the lake and making big, prosperous, commercial Chicago a city of beauty."

The harbor of Chicago is one of the busiest in America, and its water front of a narrow, winding river is a veritable working hive of industrious activity. Of itself it offers nothing of attractiveness to the seeker of civic beauty, but it compensates for this in a measure by the number of its entrances and clearances of the merchant marine. These exceed in all months of the year together any port on the continent, and the volume of its waterborne commerce is second only to the port of New York, which in turn nearly equals that of London, England. However busy these latter great ports may be with their commerce distributed over twelve months, when it is considered that in the inland lake port practically all the traffic is handled in eight or nine months, an adequate idea of the hurry and bustle during that time is hardly conceivable.

The passenger business of Chicago through its port to the lakes is enormous. Of the sixteen million persons carried yearly on the water highways of the entire chain of Great Lakes, nearly two million, or one-eighth of the total, are passengers on the steamers plying to and from this port. A goodly proportion of these are tourists bound for distant ports, and during the busy summer months they crowd the great liners to their capacity. Those operating on the old-time routes to Mackinac Is-

land, Sault Ste. Marie, and the Superior ports are, with few exceptions, large modern steamers of the highest classification. They have replaced, one by one, the old wooden vessels which thirty or forty years ago developed the business to the north, and which were then the pride of the lake marine.

The splendid steamer *Manitou,* of the Manitou Steamship Company, fairly represents the new marine. Although built and put in service between Chicago and Mackinac Island and Northern Michigan resorts, during the Columbian Exposition, in 1893, she has continued on this route each season since, making semi-weekly trips. In point of size, construction, and interior appointments the *Manitou* compares favorably with any vessel of the steamship class, which, planned to accommodate tourists for long voyages as well as for day trips, plies between ports at opposite ends of the chain of lakes. Her dimensions are three hundred feet length over all, forty-two feet beam, and she registers two thousand, nine hundred and fifty tons. There are broad decks, ample cabins, and luxurious staterooms and every convenience for four hundred passengers.

The Northern Michigan Transportation Company operates three steamers on the northern route, of which the *Illinois* and *Missouri,* built in 1899 and 1904 respectively, are sister ships. They are of steel throughout, registering two thousand, four hundred and fifty tons, and are two hundred and forty feet in length by forty feet beam. The steamer *Kansas* is a wooden steamer, two hundred feet in length by thirty-three feet beam, and was built in 1870.

The oldest and largest transportation company in the passenger traffic of Lake Michigan is the Goodrich Transit Company. From a small beginning made more than fifty years ago, the business has grown and expanded to its present proportions, which commands a large share of the class of lake commerce in which it engages. The early history of the line is interesting as showing the traffic con-

ditions of a time when the lake settlements were mere hamlets, Milwaukee a small town, and Chicago a city of only eighty thousand persons. The line was established in the Spring of 1856 by Captain A. E. Goodrich, with the small steamboat *Huron*. It was of only three hundred and fifty tons' burden, and had been built in 1852 at Newport, Mich., by Captain E. B. Ward, one of the prominent vessel owners of the time. She plied between Chicago and Milwaukee, running up one day and back the next, and was perfectly capable of taking all the business offered. At her usual speed nearly ten hours were required for a single trip. Her engines were of the low-pressure type, and her boiler furnaces consumed cords upon cords of wood, — the only fuel obtainable.

The line grew and prospered, increasing its business with the development of the lake country. By 1860 the population of Chicago had reached one hundred and ten thousand, and Milwaukee was fast becoming a place of importance. With the natural increase of the lake commerce the A. E. Goodrich Steamboat Line, as it was known, came in for its share, for the sturdy captain commanded his own vessel, was manager and press agent as well, and knew every detail of the business to a fine degree. In 1860 the side-wheel steamboat *Comet* was put on the line and continued in service until November, 1869, when she, too, was dismantled. The steamboat *Sunbeam,* another side-wheeler, built in 1862, at Manitowoc, was in service for a number of years.

Compared with the modern type of side-wheel steamer these old-timers were curious specimens of marine architecture. Their huge paddle-wheels and the boxes inclosing them, the high and ungainly walking-beam, the little box-like pilot house, and the big lettering of the name would look very odd in this generation. Still there are many of the old lake captains who remember them well, and delight in recalling stories of their performance in

gales, the crowds of eager people they sometimes carried, and their bursts of speed in the frequent races engaged in to determine the fastest steamer — to the satisfaction of the mariners and for the supremacy of the lake.

The large steamer *Planet,* built by Captain Ward at Newport, in 1855, and which was a leviathan of the time, was added to the line about 1863. She was of twelve hundred tons, and splendidly furnished, but ran only until 1866, when she was taken off the line and dismantled. The steamer *Northwest,* another well-known passenger boat of the side-wheel type, was operated for two years, but in 1868 she was sent to the route between Detroit and Cleveland to take the place of the *Morning Star,* which had been lost in collision. In 1868 the business was incorporated under the name of Goodrich Transportation Company, with Captain Goodrich as its first president, which office he held until his death in 1885.

The present fleet of the Goodrich Transit Company, (the corporate name adopted in 1906) is composed of nine steamers and one tug. Of these the big whaleback steamer *Christopher Columbus* is the largest single unit, and in fact the largest vessel built for the passenger service since the days of the famous railroad liners, the *Western World* and the *Plymouth Rock,* which plied on Lake Erie in 1854–57. In the intervening years passenger traffic had easily been cared for by the steamers ranging in size from one hundred and fifty to three hundred feet in length; but the impetus given about 1893 to tourist travel on the water highways of the lakes resulted in the construction of many splendid steamers of larger size and capacity. The strides thus taken within the last fifteen years fill many interesting pages of the marine history of the lakes.

The hull of the *Columbus* is in no way different in construction from the ore-carrying whalebacks. It is three hundred and sixty-two feet in length and forty-two feet beam, and registers fifteen hundred gross tons.

Above the main deck are five turrets of steel upon which are built the promenade, upper, and hurricane decks. Being a day boat the decks are wide and open except for observation and dining saloons, and the passenger capacity is thus greatly increased, and exceeds four thousand. Unlike the freighters, the machinery is placed just aft of the waist section, the one big smoke funnel and exhaust pipes passing through the third turret. The engines are of five thousand indicated horse-power, sufficient to drive the stanch vessel at a speed of eighteen miles an hour, in all conditions of weather and sea. For fifteen years the *Christopher Columbus* has plied between Chicago and Milwaukee, and is still (in 1909) the largest day and excursion steamer on the Great Lakes.

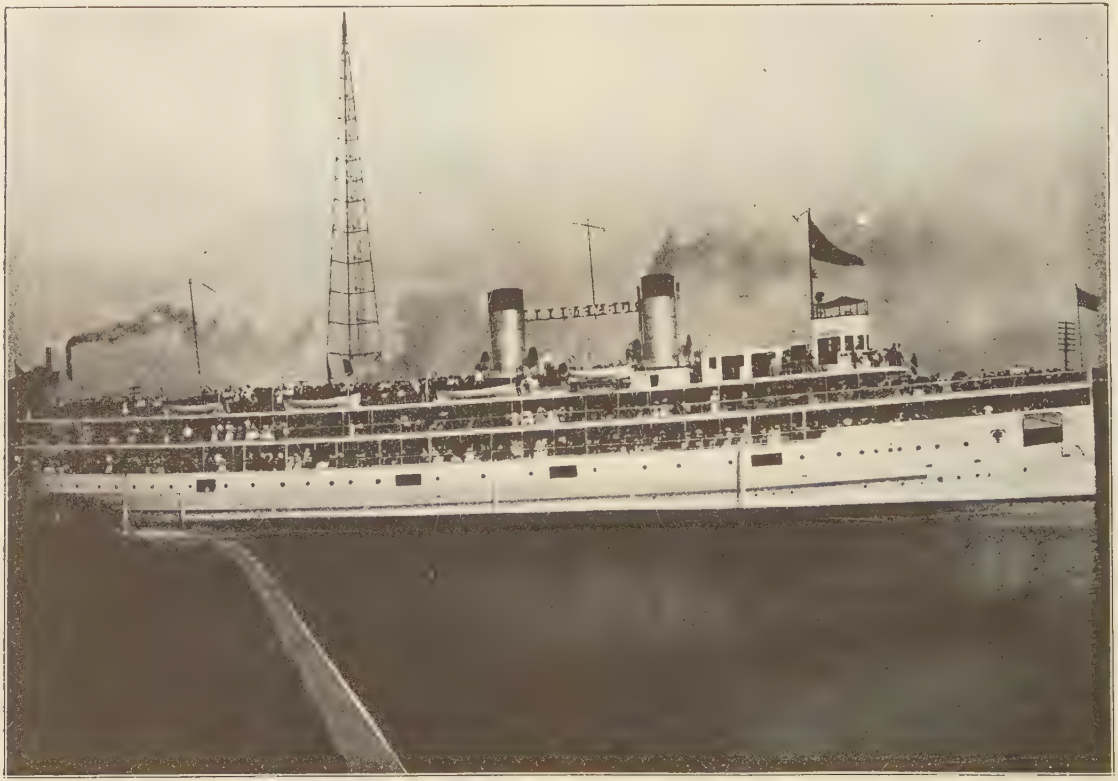
Next in size, but equal in speed and seaworthiness is the steamship *Virginia*. She is two hundred and eighty-five feet in length, thirty-eight feet beam, and registers sixteen hundred gross tons. The *Virginia* is fitted up as a night boat, providing every comfort for travellers. Running with the *Virginia* on the night trips between Chicago, Grand Haven, and Muskegon, is the steamer *Indiana* which, though smaller of dimensions, being two hundred and twenty feet length by thirty-five feet beam, is one of the popular steamers on Lake Michigan. On the night trips between Chicago and Milwaukee are the steamers *Iowa* and *City of Racine*, practically of uniform size and speed with the *Indiana*. The oldest steamers now in service are the *Sheboygan*, built in 1869, and the *Chicago*, in 1874. These with the *Georgia*, which came out in 1880, and the *Carolina*, ply between the metropolis and Milwaukee to the ports along the Wisconsin shore, including Manitowoc, Sturgeon Bay, Menominee, Marinette, Washington Island, and Escanaba. On this route they make four to six trips weekly in sight of land, with one trip extended to Mackinac Island.

The Graham and Morton Line is a powerful factor in the passenger and fruit business between Chicago and

St. Joseph, Benton Harbor, Holland, and Ottawa Beach, all important shipping points and summer resorts along the Michigan coast. The fleet is composed of four large steamers of steel, of which the *City of Benton Harbor* is the largest single unit. It is two hundred and fifty-one feet in length by thirty-six feet beam, and of thirteen hundred tons' register. The *City of Chicago* which runs on the St. Joseph division in connection with the *City of Benton Harbor,* is two hundred and twenty-six feet length by thirty-four feet beam, and registers eleven hundred and fifty tons. On the Holland division are the steamers *Puritan,* of dimensions two hundred and thirty-three feet length by forty feet beam, and the *Holland,* two hundred and thirty feet in length by thirty-three feet beam, giving daily service. During the fruit-shipping season the sight of these steamers entering the port of Chicago, laden to the very guards with thousands of baskets of peaches, is both surprising and instructive. It emphasizes the great wealth of the country along the Inland Seas.

The steamer *South Haven* is a modern steel vessel, of dimensions two hundred and forty-seven feet keel, two hundred and sixty feet length of deck, by forty feet beam, and plies between Chicago and South Haven and Muskegon. It is a popular steamer among the resorters of the Michigan shore, and enters largely into the fruit transportation across Lake Michigan.

Of the constantly increasing fleets of excursion steamers running in and out of the principal ports of the Great Lakes, the new and fast steamers of the Indiana Transportation Company command first place. The most famous of these is the *Theodore Roosevelt.* With broad open decks providing wide promenades, she has a capacity of thirty-five hundred passengers, and is often taxed to the limit on her popular run to Michigan City, Indiana, which is made twice daily. The new craft is two hundred and eighty-nine feet in length, forty feet beam, sixteen feet depth, and from the keel to the bridge



Theodore Roosevelt, EXCURSION STEAMER

THE *SARANAC*

A "PIG" OR WHALEBACK

is fifty-two feet. The hull is divided into seven water-tight compartments and with double bottoms and trimming tanks to prevent listing, the vessel is practically unsinkable.

The motive power of the *Roosevelt* is of quite unusual power for a vessel of her size, and is capable of driving her at a speed of twenty-four miles an hour. The four-cylinder triple-expansion engine is placed just aft of the midship section, and is thirty-two feet long by about twenty feet in height. It extends four feet above the main deck and, being adjacent to the social hall, is inclosed by a mahogany rail so that the passengers can watch its smooth and steady motion. The cylinders are thirty, forty-eight, and fifty-six inches in diameter by forty inches stroke, and are supplied with steam from seven Scotch boilers eleven feet, six inches in diameter by eleven feet long, and working under a pressure of two hundred pounds, with Howden hot draft.

The electrical equipment of the steamer is most complete. Besides the thousand or more lamps, and the five thousand candle-power searchlight, high on the bridge deck, there are streamers of colored lights extending from stem to stern. Far above the hurricane deck between the smokestacks and outlined against the sky, is a huge sign *Roosevelt,* which may be read for some distance. At night each letter of flaming light stands out in bold relief, thus forming the name as a sort of beacon of hope and life.

Another favorite steamer of the line is the *United States*, which, as its name suggests, is a patriotic craft of rare attractiveness. Above the four decks, which accommodate twenty-five hundred passengers comfortably, are suspended electrical effects consisting of a streamer of red, white, and blue lights, an immense shield and star similarly lighted, the name of the ship in twenty-four-inch letters, and the " star-spangled banner " flashing on and off the Stars and Stripes in a waving effect. All through

the cabins are pictures and tablets giving in paintings and phrases the history of the country. Handsome gold and silver lettered, cut-glass tablets bearing patriotic sayings of great men line the sides of the cabin. Photographs of the governors of all States and Territories in the Union adorn the walls. In a conspicuous place is a wooden map of the United States, composed of woods from all parts of the country, each piece being carved in the exact geographical shape of the State from which it came. The specimens of wood were furnished by the governors of the various States. The mountain ranges, oceans, river and water courses are all shown, and the principal cities designated. The State capitals are shown by pearl stars. It is the only map of its kind in existence.

The engines of the *United States* are triple expansion with cylinders thirty-two, thirty-six and one-half, and sixty inches in diameter by forty inches stroke, and develop sufficient power to place the vessel among the twenty-mile flyers. Steam is supplied by three large Scotch boilers thirteen feet, three inches in diameter by twelve feet, four inches long. There are two twenty-five kilowatt turbine electric generators for the illumination of the ship, and the large searchlight which, with the attractive special electrical effects, distinguish the steamer wherever and whenever seen.

Through the world's greatest water highway, connecting Lake Huron and Lake Erie, the splendid day steamers of the White Star Line ply back and forth daily from May to November. They are of the day or excursion class, of large size and passenger capacity, and are among the fastest and finest equipped for such service on the lakes, or in fact upon any waters of the continent. The squadron is composed of five steel steamers, the *Tashmoo, Greyhound, City of Toledo, Owana,* and the new boat *Wauketa*, commissioned in 1909. Designed especially for the day trips between Detroit, Sugar Island, and Toledo, and northward from Detroit, the St. Clair Flats,

and Port Huron, their decks are open to the cool lake breezes, thus affording comfortable space for from two thousand to thirty-five hundred people.

The steamer *Tashmoo,* which has a hull moulded on the fine lines of a swift yacht, is equipped with engines of great power, and is one of the fastest steamers flying the American flag. She is three hundred and twenty feet in length, thirty-seven feet in beam, seventy feet in width of decks, fourteen feet in depth, and is licensed to carry thirty-five hundred passengers. Designed especially for the river service she plies between Detroit and Port Huron daily in a double trip, from the middle of June to the middle of September.

A large, fast steamer of uniform size and accommodations is the *Greyhound,* which plies between Toledo and Detroit, stopping on both daily trips at Sugar Island Park, the attractive resort laid out and conducted by the White Star Line. The steamer *Owana,* of dimensions two hundred feet length by thirty-two feet beam, is the companion boat on this route, leaving Detroit in the morning and Toledo in the afternoon. The afternoon run out of Detroit for Port Huron is taken by the *City of Toledo,* which is two hundred and twelve feet length by thirty-two feet beam, and carries two thousand people. A special afternoon run is made daily during the Summer to St. Clair and intermediate points along the river, the steamer returning on an early morning trip and arriving at the city wharf in time for the day's business.

Southward from Detroit on the "Island Route" plies the steamer *Frank E. Kirby* which, because of high speed, is known as the "flier of the lakes." Her course is through the lower stretches of the entrancing river, across the open lake to historic Put-in-Bay and the other islands of the group, and on to Sandusky. On the broad bay of the same name, but facing the lake, is the "Coney Island of the West," which, during the Summer months, gives to the old port an appearance of some commercial im-

portance. Four smaller steamers ply back and forth across the crystal waters of the bay, and the steamer *Arrow* makes frequent trips between the city and Put-in-Bay. The steamer *Lakeside* is in regular service between the Islands and the south shore points. During the busy fruit-shipping season from the Islands and the south shore, the lake steamers come into port almost daily, heavily laden with peaches, grapes, and other fruits for which the region has long been famous.

The fine large steamer *Eastland* of the lake type of steamship runs between Cleveland and Cedar Point (the Coney Island), making daily trips during the excursion season. Throughout the upper lakes there are lines of independent and smaller steamers operating on routes such as: Cheboygan to Sault Ste. Marie; Mackinac Island to Les Cheneaux (the Snows) Islands, the fine fishing grounds; Marquette to Grand Island and the Pictured Rocks; Marquette to Houghton and Hancock; from these points to Duluth; and from Duluth to Port Arthur and Fort William and thence to Isle Royal.

CHAPTER XIX

THE MERCHANT MARINE OF CANADA

Ties which Bind the Great Lakes Region to the St. Lawrence — Early History of Richelieu and Ontario Navigation Company — Routes and Consolidations — Present Fleet — Divisions of Through Traffic — New Steamers — Saguenay River — Niagara Transportation Steamers — Other Steamers on Lake Ontario — History of the Northern Navigation Company — Fusions and Development of North Country — Present Fleet — Routes — The Steamship *Hamonic*.

VERY much of the romance in the history of the American continent, from the time of its discovery to the present day, is crowded into that section which forms the watershed of the St. Lawrence River. Almost every point of interest, from the Niagara frontier down Lake Ontario and the grand stream to where it broadens out to the gulf, was once the scene of some romantic episode of history, coupled with scenery that is grand and beautiful, magnificent and charming. The very existence of the great Inland Seas to the west became known to the world through exploration and discovery undertaken by the adventurers of New France who, with marvellous fortitude and perseverance and undergoing great hardships, finally reached their headwaters. Through every bay and inlet they planted the flag of France, and sowed the seeds of progress of a civilized and enlightened race. Their zealous missionaries proclaimed to every wandering tribe the religion of the home land and everywhere laid the foundations of peace and showed the ways of kindness. They won the confidence and enjoyed the affection of the savage tribes and often treated them as

brothers. They led the same rough life of the wilderness, and the Indians shared with them their wigwams and the fruits of the chase. For these reasons the two great regions — the Great Lakes and the St. Lawrence — are indissolubly united by sentiment.

This, however, cannot be said of the regions in a commercial sense. As with all nations, that intercourse is as a thing apart. From the very geographical divisions, the chasm of Niagara, and the differences of tongue and temperament of the habitant and the Yankee, the commerce of Lake Ontario and its outlet, the noble St. Lawrence, and that of the four upper lakes, are in nearly every respect distinct and separate. Niagara, although a formidable barrier to interlake commerce, has by the genius of man been surmounted, is not of itself sufficient to effect this result. The Welland Canal and the locks which pass it, and those of the St. Lawrence system, float vessels two hundred and fifty-six feet in length, forty-four feet beam, and of twenty-five hundred tons' burden.

But notwithstanding the great strides which have taken place in marine architecture and the consequent deepening of channels in straits and ports within the last fifteen years, any further development of the government works along these lines is not contemplated. It is a well established fact that in the canal policy of Canada an enlargement of the canals and locks to accommodate the latest type of vessels on the upper lakes, namely, six hundred feet in length, sixty feet beam, and of twenty to twenty-four feet draft, is regarded as impractical and infeasible. Parliament now leans toward the development of the Georgian Bay-Montreal route as a ship canal, which will ultimately be constructed, following very closely the pathway of the early explorers in their journeyings to Michilimackinac and the Northwest. This will open a direct route from Port Arthur, at the head of Lake Superior, to Montreal to vessels carrying thirteen thousand tons; and will be the main highway of commerce

for the rich products of the Northwest destined to foreign ports.

Although the waters of Lake Ontario and the upper portion of the St. Lawrence River, inclusive of the Thousand Islands, are shared equally by the United States and Canada, the commerce borne on them is almost wholly Canadian. The St. Lawrence is the great highway of commerce for the Provinces, and upon its deep and well-lighted channel from Montreal to the sea, a great foreign trade is floated. A large class of trans-Atlantic liners and numerous coasting vessels steam for nearly seven hundred miles from the gulf to Montreal where their cargoes are distributed throughout the Dominion. In return, the liners take the products of the forest, the grains of the vast Northwest, and manufactured articles to populous Europe. The enterprise which has reaped the profits of navigation below Montreal likewise controls the shipping of the upper river, and it is not surprising, all conditions considered, that the bulk of the waterway commerce of that stream and also of Lake Ontario should be carried in Canadian bottoms. As a matter of fact, the tonnage flying the Stars and Stripes is small, and is composed almost exclusively of passenger boats of limited capacity. It is not upon these waters that the marine enterprise of the United States has manifested itself, nor is it likely it ever will.

The largest and most important corporation engaged in the lake and river commerce is the Richelieu and Ontario Navigation Company. It is also the oldest transportation line in Canada, having been established long before the beginning of the expansion of her material resources. From a small beginning the line has grown and prospered by application of sound business principles to its present commanding position, and plays an infinitely larger part in the transportation world than dreamed of by the originators of the service. Away back in 1845 " La Société de Navigation du Richelieu " was formed among

the farmers living along the Richelieu River, for the purpose of running some boats to bring the produce of their farms to the market at Montreal. The service proved of such advantage to the thrifty French Canadians who participated in the benefits that, two years later, the line was extended to include the towns along the St. Lawrence to and beyond the mouth of its tributary, the Richelieu.

In the beginning the little fleet consisted of only one steamboat, the *Jacques Cartier,* and one barge which was towed up and down the river. By 1856 the traffic had so increased that the business was reorganized under the name "La Compagnie du Richelieu," and two small steamers were put on the line between Montreal and Quebec. They were named the *Napoleon* and the *Victoria.* Soon after their appearance to wrest a share of the business enjoyed by the Molson and Torrance boats, the former of which had inaugurated steam navigation on the St. Lawrence, a fourth line was started by Tate Brothers. This naturally created keen competition as there was scarcely enough traffic to sustain two lines of steamboats, and a great rate war developed in which travellers were carried for almost nothing. Steerage passage for a time was as low as twelve and one-half cents, and the first-cabin rate was one dollar, which included berth and meals.

One of the popular features of a river trip was a race with some other steamboat in which everything was staked, even the safety and comfort of the passengers, to secure the credit of being the faster boat, and landing ahead of the rivals. It must be said, however, that the practice seems to have been sanctioned by the travelling public, which enjoyed the exciting scenes and evidently regarded it as a pleasant diversion, although a dangerous one. How long the ruinous competition would have continued, had it not been for the disaster to the steamer *Montreal,* in June, 1857, can only be conjectured. This event brought the vessel owners to their sober senses, and

QUEBEC, AS SEEN FROM LEVIS

Trinity Rock, Saguenay River

the traffic was arranged so that the Richelieu Company controlled the largest share of the passenger business. It was so lucrative that the shareholders drew as high as fifteen to twenty per cent dividends. In 1861 the company absorbed the St. Peter Navigation Company, which operated steamers on the same route.

In 1875 occurred the amalgamation of the Richelieu Company and the Canadian Navigation Company, or the upper Canada line, and the Union Navigation Company, and the name which has continued through the remarkable development since then, was given it. At this time the newest and largest steamers of the line, the *Montreal* and *Quebec,* were considered so much in advance of other vessels in American waters, that their models were exhibited in foreign cities. By 1880 four other navigation companies of the mighty river were brought under the Richelieu and Ontario management, and the mileage thereby increased to one thousand, one hundred and seventy-six, including branches, where it stands to-day. It is thus evident that a great measure of the success of this old company is due to its vigorous fight against opposition and rate wars, and its capability of absorbing its rivals and turning the business thus secured to good account. That the travelling public is better served by the one great corporation is undoubted, since it has been left in practically undisputed possession of the field covered by its steamers.

The present fleet in service consists of twenty-six steamers, and fairly represents the evolution of Canadian shipbuilding from 1847 to the present time. Some of the earlier steamboats of small size and curious proportions, which had been brought together by fusion and consolidation, are used for the most part as ferries and market boats. Of these the *Columbian* (now the *Brockville*) and the *Hamilton,* although both rebuilt and refitted, are the oldest hulls afloat in Canadian waters. With the *Spartan* (now the *Belleville*), the *Corsican* (now the *Picton*), the

Hochelaga, and the *Berthier,* they form a class by themselves, being from one hundred and seventy-five to one hundred and eighty-four feet in length. The *Bohemian* (now the *Prescott*) is of one hundred and ninety-five feet measurement; the *Terrebonne* and *Chambly*, sister ships, are only one hundred and fifty-six feet; the *Three Rivers* and the *Chicoutimi* are two hundred and twenty feet; and the *Virginia* (now the *Tadousac*) and the *Beaupre* are two hundred and sixty feet long. Aside from these and four others in reserve, there are the splendid new steamers of steel, equipped with the most powerful engines, which ply on the regular tourist route between Toronto on the west and Chicoutimi, at the head of the Saguenay River navigation.

This entrancing stretch of water, seven hundred and seventy-eight miles long with its world-famous trip through the Thousand Islands, the running of the St. Lawrence Rapids, and the scenic trip of the lower St. Lawrence, terminating with the run up the Saguenay, is covered by nine steamers, and daily service is maintained from one end to the other, during the Summer months. The rapids of the St. Lawrence and the general conditions of the tourist travel require the entire route to be divided into four divisions. The first, or lake section, is from Toronto to Prescott; then to Montreal through the rapids; on to Quebec; and the steamers of the last section run through to Chicoutimi. In this lower St. Lawrence country are the two fine hotels built and conducted by the Richelieu and Ontario Company, namely, the Manoir Richelieu at Murray Bay, and the Tadousac Hotel at the confluence of the Saguenay with the broad river which flows on to the gulf.

The first lap of the inland voyage, from Toronto as the starting point, lies across Lake Ontario to Charlotte, New York, which is the lake port of Rochester. Leaving the Canadian city in the middle of the afternoon by either the steamer *Kingston* or the steamer *Toronto,* the traveller

draws away from the world of the familiar which has grown wearisome, and has a glimpse across the border into the world of something new. As the day wanes he finds mental rest and tonic through the widening doorway of the tranquil sea, and sees two yellow moons, the serene moon in the sky and the troubled moon in the lake, ere sleep draws her veil. Ploughing her way onward across the lake to its outlet, the steamer is an interesting study, as it exemplifies the progress of Canadian industries.

First of all there is no part of the material — of steel for the keel, ribs, or plating, no part of the castings for the engines, nor of the selected woods for the cabins, parlors, and staterooms — that is not wholly a production of Canada's resources. Then, the fabricating of the thousands of parts into the hull and the mechanical being of the ship, the construction of the upper works, the finishing and artistic decorating, and, withal, the furnishings and fittings, represent the genius and skill of engineers and artisans of the Dominion. Furthermore, the seamanship which guides the vessel safely through gales on the lake, through tortuous channels of river and rapids, and brings it into port in perfect condition and on schedule time, is of that old and valued stock of mariner which has sailed for centuries under the Cross of St. George. The steamers *Kingston* and *Toronto* are each two hundred and seventy-eight feet in length, sixty-two feet width over the guards, and fourteen feet depth, and were built in 1901 and 1899 by the Canadian Shipbuilding Company. They are of side-wheel propulsion, having a normal speed of seventeen miles an hour, which can easily be increased to twenty miles when desired. One of the features of these steamers is the location of the dining-room on the main deck, which gives an abundance of light and air, and affords a good view over the water.

Early in the morning the steamer passes through the picturesque Bay of Quinte and arrives at Kingston, the largest city between Toronto and Montreal, before the

breakfast hour. Shortly after it leaves for the winding course through the Thousand Islands, stopping at Clayton and Alexandria Bay, New York. The traveller, meanwhile, enthuses over the scenery, as he has every reason to, for stretching out in a span of the river, fifty miles long, are sixteen hundred and ninety-two islands of surpassing beauty. They are of varying size, shape, and appearance, from the small barren rock projecting from the surface of the river to the large fertile area of land, covered with richest foliage and lofty trees. Many of them are crowned with summer residences of widely different styles of architecture, the modest cabin of the camper and the magnificent castle of the millionaire; while others remain in the simplicity of natural beauty.

"Throughout its entire length the St. Lawrence has the clearness and purity of a mountain spring, and combines in its length the picturesque beauty of islands and valleys, the exciting descent of rapids, and the bold magnificence of mountains split in twain at its very shores. The waters of Lake Ontario are filtered through the thousand gems of island beauty at its source, and they are hardly dissolved from view before its surface is churned into foam and spray in the rapids as it rushes toward the sea, navigable to larger steamers than can enter the locks on the return."

Over the broader stretch of river the steamer proceeds to Brockville and thence to Prescott, where, alongside the dock, one of the new river steamers is ready to take the traveller to Montreal. The *Rapids King* and *Rapids Queen*, two hundred and forty feet in length, by forty-four feet beam, with their broad decks and large cabins fitted with sliding glass windows, are ideal observation steamers, and they form a class by themselves for the St. Lawrence service.

Soon after the view of Prescott fades away in the distance, the first troubled waters, the Galops, are passed, and a few miles further the Rapids du Plat. By noon the

Long Sault, with its snow-crested billows of raging water, comes in sight. The " shooting " of these rapids, which are nine miles long, and the greatest but not the most dangerous of the group, is a most exciting experience. Directly in front of the steamer is a seething mass of churning water, rushing with headlong speed down a declivity which stretches ahead beyond the range of the eye. With steam almost shut off the vessel dashes in among the waves and with two heavy plunges comes up against what seems to be an advancing wall of water. Rushing along by the sheer force of the current she cuts through this, at a speed of twenty miles an hour, past jutting headlands, close to threatening rocks, with foaming spray dashing over her bow and amid the ocean-like roar and tumult of the breakers.

Along in the afternoon the Coteau Rapids, about two miles long and very swift, are passed, and a few miles further down the turbulent Cedar Rapids are encountered. These are run at full steam, and so swift is the current that the vessel attains a speed of forty-five miles an hour for a few minutes. Following right after are the Split Rock Rapids and the Cascades, the latter " conspicuous by white-crested waves which mount tumultuously from the dark green waters in such a choppy, angry way, that they make the vessel lurch and toss as though at sea." Through the expansion of the river, Lake St. Louis, and past one of the mouths of the Ottawa River, the steamer continues until, passing through the dangerous Lachine Rapids with a fall of forty-five feet, she comes out into calm waters. Sweeping under the Victoria Bridge she finally arrives at her wharf in superb Montreal.

The third section of the journey, from Montreal to Quebec, is made at night in one of the two new steamers bearing the names of these cities. They are the largest of Canada's passenger fleet in river service, and being designed for night trips, have berth accommodations for upwards of seven hundred and fifty passengers. In point

of size, appointments, and speed they compare favorably with the giant greyhounds of the Great Lakes, which equal or surpass the proudest vessels upon any inland waters of the globe. They measure three hundred and forty feet in length, forty-four feet beam, or seventy-five feet, six inches width of deck, and fifteen feet depth; and, equipped as they are with the most powerful engines, have a normal speed of seventeen miles an hour. The steamers have different schemes of decoration, as it is the purpose of the company to have each one present its own artistic beauties. At the head of the stairway in the *Montreal* is a large painting of Cardinal Richelieu, the "patron saint" of the line, for whom it was named.

Upon arriving at the old fortified city of Quebec, the traveller steps aboard one of the steamers plying the lower St. Lawrence on the route to Tadousac and Chicoutimi. It may be either the steamer *St. Irenee, Tadousac,* or the *Murray Bay,* but in any event he enjoys a delightful day trip down the broader stretches of the river, which assume almost the proportions of an inland sea. Its waters become as salt as those of the ocean into which it flows, and whose tides wash its shores. All along the route scenes of wild and beautiful grandeur are presented to view, the Manoir Richelieu and Murray Bay are passed, and by early evening the steamer arrives at Tadousac at the mouth of the Saguenay. After a few hours' stay she steams up the silent stream during the night, and in the morning is at Chicoutimi, ready for the return trip in daylight down the "mighty river of the north."

An adequate and worthy description of the wonderful and inspiring scenes along the Saguenay, and the grandeur of this rift in the Laurentian Mountains, probably has never been written. "The silence is absolute, unbroken since these hills flung back the dying echo of Nature's final groan, in the throes of that frightful volcanic convulsion, which left the wilderness of pine-clad cliffs, through which a dark, unfathomable river steals som-

brely, like a hunted thing." There is Ha-Ha Bay, an inlet seven miles long, and capes Trinity and Eternity midway down the river, with sheer precipices rising two thousand feet above the surface and downward to unknown depths. Other rock masses loom up at intervals, one of which is an enormous vertical polished surface of rock, called Le Tableau.

Before the day is spent the steamer is back at Tadousac, and the average man and tourist is glad to step over the border of the wilderness into the world of sameness and familiar sights. Some of them, however, may still be new and interesting for, " Far off o'er the Southern shore soar the gulls, bent on feeding upon what the waters of the incoming tide cast up, and in the bright gleam of the sun, may occasionally be seen the flash of a white-backed porpoise speeding onward with lightning rapidity, and appearing in the most unlooked-for places, much to the consternation of the old gulls who scold him strenuously for his temerity."

When the Richelieu and Ontario Navigation Company, in 1909, came to a United States shipyard for a new steamer, it was not because their own yards could not build the vessel needed, but it was due to their desire to enter the coastwise trade of Lake Ontario's southern shore and the St. Lawrence River. This they could not do with any of the steamers of their fleet built in Canadian shipyards, because of the clause in the maritime laws which bars any foreign-built ship from trading between ports of the United States. They can trade between foreign ports and any of those in the United States, whether along the oceans or the lakes, or *vice versa*, but they may not touch the domestic trade, that is, the shipments from one port of the United States to another port of the same. Although a Canadian corporation, they could build within the boundaries of the United States a steamer of any size under the existing classifications, and operate it between any and all ports of this country. This they

have done and have built to the limit as to size imposed by the Welland Canal for its passage to Lake Ontario. The steamer *Rochester*, which in 1910 established a new route for the company, is two hundred and fifty-six feet in length, forty-three feet, eight inches beam, with a draft of nine and one-half feet, and, with twin screws, has a speed of eighteen miles an hour under economical steaming power. She plies between the Niagara River, Rochester, Oswego, and the Thousand Islands.

An important link in the voyage from Niagara to the sea is the line of steamers operated by the Niagara Navigation Company, which ply between Lewiston, New York, the port for the Niagara frontier, and Toronto. Like the progressive line of the St. Lawrence, this route was established long ago, the first steamer, the *Chicora,* having been built in 1864. It is a side-wheel vessel of nine hundred and thirty-one tons' register, and measures two hundred and twenty-one feet in length. As the country and cities on both sides of the lake, which were served by the line, developed and grew in population and the commerce increased in volume, other steamers were put on, of which the *Chippewa*, of one thousand, five hundred tons, and three hundred and eight feet in length, and the *Corona,* of thirteen hundred tons, two hundred and seventy feet in length, are good examples. In 1907 the fine new steamer *Cayuga,* three hundred and eighteen feet in length, and with four broad decks arranged for the day excursion business, was added to the fleet. The run across Lake Ontario is made in about three hours by this fast modern steamer. In all, six round trips are made daily by the fleet, during the rush of tourist travel in the Summer months. There is another route to Toronto by electric railway to Port Dalhousie on Lake Ontario, thence by steamer across the lake.

Other steamers plying these waters are those of the Hamilton Steamboat Company, including two of steel and of moderate size running between Hamilton, Toronto,

and other lake ports, the Toronto Ferry Company, with two steel ferry-boats, the *Mayflower* and *Primrose,* running to the "Island" opposite the city, and numerous side lines operating along the north shore. There is the Ottawa River Navigation Company, with the steamers *Duchess of York* and the *Empress,* plying between Montreal and Ottawa, and "shooting the rapids." Then there is a vast fleet of mosquito craft — small steamers and schooners — operating on the network of rivers and canals known as the Back Lake system. They are of all sizes and types from the little power launch to a steamboat one hundred and thirty-four feet length, thirty-three feet beam, and of twelve feet draft, which is the limit of the canal locks. They are, however, by their very numbers, an important factor in the water-borne commerce of Canada, and they serve a considerable territory not directly connected by railway with the outside world.

In the interlake commerce of Canada there is the St. Lawrence and Chicago Steam Navigation Company fleet, of which four steamers are of steel. The *Algonquin, Iroquois,* and *Rosedale* are of the canal size and are engaged principally in the grain trade. The larger steamship, *W. D. Mathews*, is of four thousand tons' register, measuring three hundred and sixty-five feet length, and is in service on the upper lakes. The Canada Lake and Ocean Navigation Company operates the well-known "turret" ships of eighteen hundred tons and of canal size. The Montreal Transportation Company controls three steel steamers, the *Fairmount, Rosemount,* and the *West Mount*, and two barges, the *Hamilton* and the *Quebec*, in the lake, river, and canal trade. The Merchants-Montreal line is one of the oldest transportation companies, and the Canada-Atlantic Transportation Company is engaged in the St. Lawrence and coast trade. It owns and operates the large steamers *Arthur Orr* and *George N. Orr,* which are of twenty-eight hundred tons' register,

and belong to the three hundred and fifty-foot class of freighters.

Upon the four upper lakes, the waterborne commerce of Canada is moved by several important steamship lines, for the most part owned or controlled by the transcontinental railways of the Dominion. Of these the Northern Navigation Company, which is practically the lake division of the Grand Trunk System, controls the bulk of the merchandise and passenger business between the ports of western Ontario and the head of Lake Superior. The routes followed by its fleet lie almost wholly in Canadian waters. The main line extends from Sarnia, through Lake Huron, the St. Mary's River, and the great canal and locks to the furthermost ports of Lake Superior, — Port Arthur, Fort William, and Duluth. There is also the well travelled route from Collingwood and Owen Sound through Georgian Bay, including the Thirty Thousand Islands, with stops at quaint and curious settlements on Manitoulin Island and the North Shore, to Sault Ste. Marie and Mackinac Island. This is the great scenic region of the Great Lakes, the new wonderland in the wilds of Ontario, and is visited each season by hundreds of tourists from all parts of the United States and Canada.

The history of this upper lake line is one of consolidation and fusion of corporate interests, in which all the conflicting elements of keen competition and rate wars were dominant factors. The through route to Lake Superior was established in 1870 as the Sarnia and Lake Superior Line, and weekly service was maintained by the side-wheel steamer *Manitoba* and the propeller *Acadia*. So successful was the line that a few years later the new propellers *Ontario* and *Quebec* were added, and the *Acadia* taken off. In 1875 reorganization was effected under the name Northwest Transportation Company. The Windsor and Lake Superior Line, which operated the steamers *Asia* and *Sovereign*, on the same route, was incorporated with the Sarnia line, and for a time all five

North West locking through Sault Ste. Marie

FISHING BELOW THE LOCKS, SAULT STE. MARIE

steamers were run on the through route. It was soon evident, however, that four steamers could easily handle all the traffic offered, and the *Asia* was taken off and put into the Georgian Bay trade. Upon these waters she was wrecked some years after with great loss of life.

During these early days a voyage to the great "inland ocean" was an event in the life of any one taking it. The only communication with the wilderness along the north shore was by steamer, as the iron trail had not yet penetrated the regions so far from civilization. The principal traffic of the line, aside from the tourist travel, was with the posts of the Hudson's Bay Company, the conveyance of supplies for the mining camps, and the settlements of the far western shore. The route from Sarnia then lay along the east shore of Lake Huron, touching at Goderich, Kincardine, and Southampton, with calls at St. Joseph Island and, of course, Sault Ste. Marie. Continuing across Lake Superior to Fort William and Port Arthur, the return trip was made along the north shore, calling at the Hudson's Bay Company's posts at Red Rock, Pic River, and Michipocoten. The completion of the Canadian Pacific Railway across the North Shore country cut off the trade with the fur-trading posts, and the increased draft of larger steamers of a later day made it impossible to enter the small inlets, upon which most of the settlements were located. Thus the more direct route for the through traffic, which is now of enormous volume, was established.

In 1883 the new and powerful steamer *United Empire,* of two thousand tons, was built in the Sarnia shipyards; and in 1890 the *Monarch* of the same tonnage, and measuring two hundred and fifty-two feet in length, was turned out of the same yard. These large and stanch vessels replaced the fleet of small steamers, all of which were either sold and converted into lumber barges, or were wrecked on the bleak and rocky shores of Georgian Bay.

Between 1880 and 1900 there were two lines of

steamers plying in Georgian Bay, namely, the North Shore Navigation Company, organized in 1880, and the Great Northern Transit Company, organized in 1890. Competition was intense and resulted in the former company assuming by purchase the steamers and assets of the Great Northern Company. From this consolidation the present company, the Northern Navigation Company, was evolved, and shortly after, in 1900, the Northwest Transportation Company, the Lake Superior Line, was absorbed and became a part of the one great corporation, and its steamers added to the fleet. The progressive policy and careful management under sound business principles of the new transportation company, and the addition of two mammoth steamships of great speed and perfect appointments, have left it in complete possession of the valuable water routes.

The present fleet comprises ten steamers of an aggregate tonnage of nearly twenty thousand. It is well balanced for the various requirements of the different routes covered. There is the little twin-screw *Waubic,* new, of one hundred and thirty-eight feet length, and of five hundred tons, for the tortuous channels of the Thirty Thousand Islands, and the splendid *Hamonic*, three hundred and sixty-five feet in length, of five thousand, two hundred and sixty-four tons, plying to the Lake Superior ports. Then there are the two package freighters, the *Ionic* of iron and the *Doric* of steel, which transport thousands of tons of merchandise in a single trip. The westbound traffic is chiefly general package goods, while the eastbound is made up of grain and flour from the granary of the Empire — the northwest Provinces of Saskatchewan, Alberta, and Manitoba.

The stout oak propellers *Germanic, Midland,* and *Majestic* ply on the Georgian Bay-Mackinac route, making four round trips weekly during the tourist season. The traffic is largely farm products and live stock, and supplies from and to the thriving little towns and Collingwood,

which is the largest and most important port on Georgian Bay. The new twin-screw *Waubic* runs along the tortuous channels of Parry Sound division, which are the most winding on this chain of waterways. The Lake Superior division of passenger steamers is composed of the *Saronic,* of oak, registering two thousand tons, and two hundred and fifty-two feet in length, the *Huronic* of steel, thirty-three hundred tons and three hundred and twenty-five feet in length, and the new leviathan *Hamonic,* completed for the season of 1909.

This splendidly appointed steamship is not only the largest vessel ever turned out of a Canadian shipyard, but is the finest and fastest passenger and freight vessel on the Inland Seas. In point of general arrangement of decks it is very similar to the famous *Juniata* of the Anchor Line. It has larger power, however, and consequently is much faster than ships previously constructed for the Lake Superior trade; and while not actually so long over all as the *North West*, her great beam makes her the largest ship of her class ever built on the lakes. The *Hamonic* is three hundred and sixty-five feet in length, fifty feet beam, and twenty-seven feet moulded depth, and has five decks. The hull was built on the channel system with double bottom and in accordance with the highest classification of the Great Lakes register. To render the ship practically unsinkable the freight hold is divided into eight water-tight compartments by steel bulkheads. Within the hold there is space for thirty-five hundred tons of merchandise, while upon the decks above in parlors and staterooms there are accommodations for four hundred first-class and seventy second-class passengers. The full crew numbers about one hundred and ten men.

The motive power consists of quadruple-expansion engines of the Yarrow, Slick, Tweedy counterbalancing type. The cylinders are twenty-four, thirty-five, fifty-two, and eighty inches in diameter by forty-two inches stroke, and are supplied with steam from six Scotch boilers, twelve

feet, six inches in diameter, of two hundred and fifty pounds working pressure, and equipped with the Howden forced draft. The maximum power developed, which is rated at seven thousand horse-power, is sufficient to drive the ship under usual conditions of sea and weather at a speed of twenty-three miles an hour. The auxiliary machinery consisting of steam steering gear, steam capstans and winches, pumps, ash hoists, and so forth, are of the latest approved type; and nothing has been spared to make the mechanical equipment of the ship the most complete of any vessel running to Lake Superior.

The plans of the *Hamonic*, which were worked out by the builders, the Collingwood Shipbuilding Company, were approved by Frank E. Kirby, the famed master of shipbuilding, and the decorations were designed by Louis O. Keil, whose art is to be seen in all the best examples of lake steamers and those plying the Hudson River.

Other fleets of Canadian steamers are those of the Canadian Pacific and the Algoma Central and Hudson's Bay Railroads. The former operates five or six Clyde-built vessels, which, being too large to enter the canals of the St. Lawrence and the Welland, were cut in two and towed through in sections. Then they were put together again at Buffalo, for service between Georgian Bay ports and Port Arthur and Fort William. The Algoma Central operates four steamers, one of which is a side-wheel passenger boat, the *King Edward*, plying between Cleveland and the Canadian Soo. The others and one barge, the *Agawa*, of thirty-three hundred tons, are package freighters, and are feeders for the railway which runs northward from Sault Ste. Marie, Ontario, toward Hudson's Bay.

CHAPTER XX

THE BUILDING OF A LAKE FREIGHTER

Wood Unknown To-day — Construction of the *Juniata* — Scenes in the Forge and Moulding Shops — Rolling and Punching the Plates — Riveting Everything Fast — The Steel Skeleton out in Yard — In the Machine Shop — The Wonders There — The Engines and Other Machinery — The Boilers — Inside the Hull — The Launch and Trials at Dock and in Lake.

A LAKE freighter in being, like all things else of a material nature, must have a beginning; and, in the present age of iron and steel, this takes place long before any part is visible in the shipbuilders' yard. The actual beginning is when the iron ore is dug out of the earth, scooped up by huge steam shovels on the iron ranges of Minnesota or Michigan. How the raw material is hauled by rail a hundred miles or more to the Lake Superior ports, how it is freighted down the lakes to the smelters in Pittsburg or Chicago, how the steel mills then convert the iron into structural steel for ship material, are features of a vivid story of our intense commercial activity. They are the multiple operations of a great industry, the foremost in America and abroad, the prosperity or depression of which affects the whole people.

In the modern shipyard wood is almost an unknown material. Only in the joiner shop does it find use, and then but sparingly, for the fittings and furnishings of the ship's cabins. The shipyard is a great machine shop, with all the sights and sounds, the smells and very taste that make the atmosphere of the foundry, the forge, and the rolling mill. For, in the construction of a steel freight ship, from the laying of the keel through all the various

stages of erection, to the final plate and the last rivet, steel is the one element. But for this purpose it must be of an exact and uniform quality, every pound of steel girder and every inch of steel plate being furnished, after careful tests, with the last atom of its strength known and guaranteed.

Taking this material as it comes to the yard to shape it into keel, ribs, and arches, to roll it into plates, to forge it into stem and stern post, to cast it into parts for the engines, is to perform Titanic tasks infinitely more intricate than can be seen with the eye. The collecting of the parts and assembling them into the structure and very being of the ship, by riveting and with braces and bolts, thus forming the shell or hull in exact accordance with the specifications, are nice tests of the artisan's skill. But the launching of the vessel, the installing of the machinery, the erection of the stack and funnels, and finishing touches here and there, completing a leviathan of the lakes, constitute the outward and visible evidences of the expert knowledge required in such work. And then there is the great system in which some two thousand machinists, forgers, riveters, and engineers are working in full accord and perfect harmony.

Two package freighters, so called to distinguish them from the coarse or bulk cargo ships, of widely different material and construction as well as size and tonnage, will serve very well to illustrate the remarkable development in such carriers during the last twenty years. One is of wood, the *Pennsylvania*, the other is of steel, named the *Juniata*. The former, of the Great Lakes and St. Lawrence Transit Company, is a small craft as lake vessels average to-day, being one hundred and sixty by thirty-five feet, and of four hundred tons, which gives her a cargo capacity of about seven hundred tons. Such steamers are of service in trading along the lake shore towns, the channels to which, because of shallowness, bar the larger freighters.

In the days of the wooden ship, when the *Pennsylvania* was built and launched with the enthusiasm at all times attending such events, the work was a case of main strength and the woodworker's eye. The designers then were careful mathematicians, as are those of to-day, but they were dealing with oaks and teaks whose density, elasticity, warp, and resistance to stress and strain were infinitely varied. They might plan and make calculations which seemed intricate and puzzling, and which might prove true in practice, but the most expert of them could never tell what the mechanics would find in the timber. Hence, much dependence was placed upon the shipwrights' judgment to alter the figures as required by the material which came into their hands.

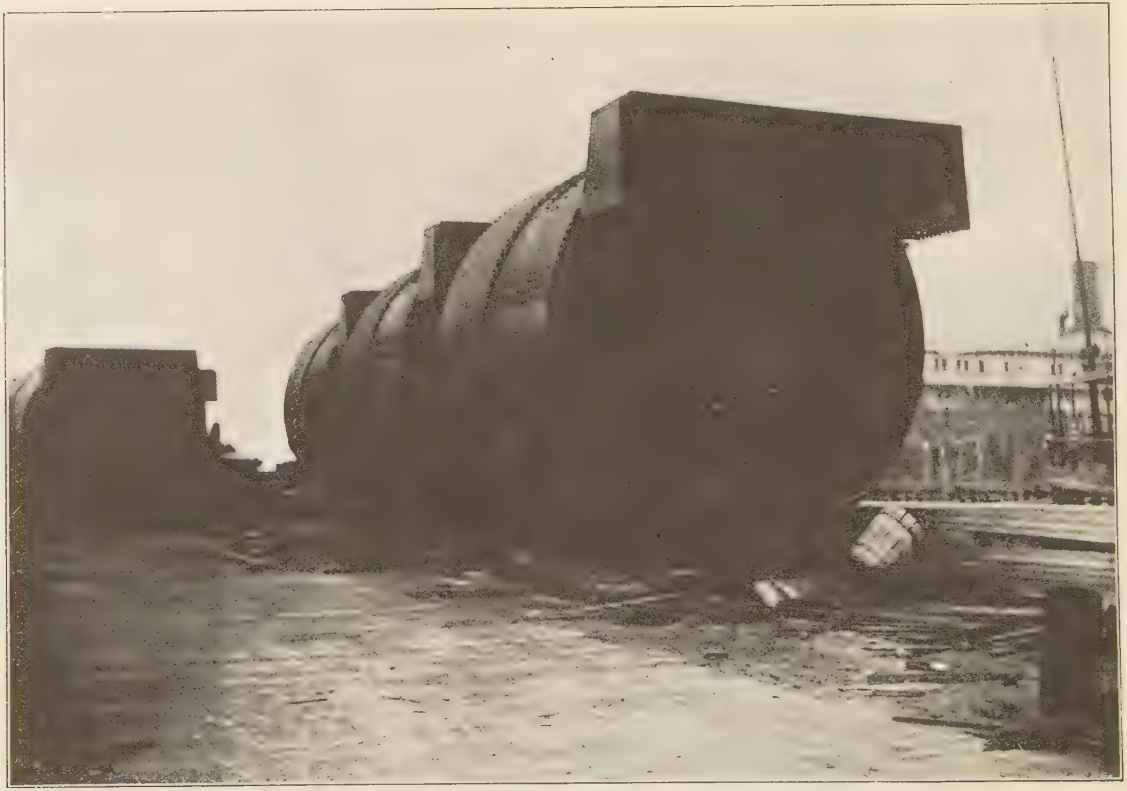
Aside from the force of human strength, there were only the block and tackle and the aid of horses to lift the heavy oaken beams and knees into place. The thud of sledges upon bolt heads, the dull hollow thump of the calker's hammer, the shouts of the men to the helpers below, the puffing of the sawmill engine and the buzzing of the saws, were enlivening features of the old shipyard. The smell of the freshly sawed oak and the fir, and of the dank logs drawn from the boom, the chips, bark, and sawdust with which the yard was paved, and the sight of the old timber drydock, are things not soon forgotten. All this is now of the past excepting in a few yards where repair work is done to the still stanch and serviceable wooden craft.

The construction of the *Juniata,* an exponent of the modern fleets engaged in the general merchandise trade, is the culmination of the mariner's highest conception of what a ship for such service on the lakes should be, and the shipbuilder's long experience in perfecting such plans and carrying them out successfully. Built at the Wyandotte yard of the Detroit Shipbuilding Company, the steamer is three hundred and sixty feet in length, forty-five feet beam, and registers four thousand, three hundred

and thirty-nine gross tons. She has cargo space in the hold and on the main deck for more than five thousand tons of general merchandise, while the upper decks are luxuriously fitted up for the accommodation of tourists. Her route lies from the Lake Erie ports and Detroit to Lake Superior and Duluth. The building of such a vessel reveals all the interesting operations and surprising methods of steel shipbuilding.

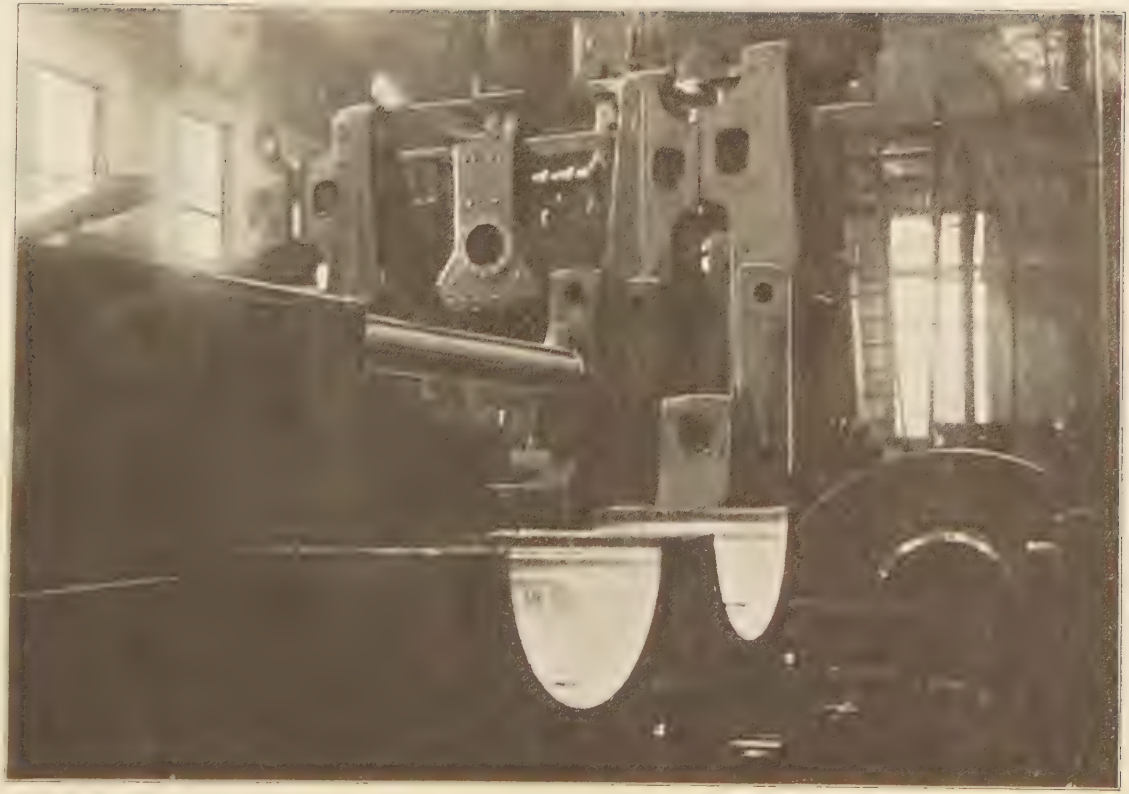
The design and specifications having been agreed upon, and the contract for construction awarded by the steamship company, the working or shop plans are prepared, lists of material made out, and orders placed for all that is needed to be worked into the ship. The making up of the requisitions for material is a very important matter, as it is necessary to have it all sent to the yard in as near the order it is to be used as possible. The plans go to the mould loft, which is generally above the main shop, where the patterns for each rib and plate are raised in the form of templates to the exact size required. The templates are made of special, heavy paper, or frequently of very thin wood scarcely an eighth of an inch in thickness. These large patterns show every line, and every rivet hole is bored so that the rib or plate for which it is intended will fit in its place exactly to a hair's breadth.

The laying of the keel is the first actual work of the ship's being, and consists of building up on the blocks a continuous steel girder for nearly its whole length, but very strong and rigid. As the work proceeds the angle bars, which were bent into shape according to the templates in the forge shop, are brought out piece by piece and riveted fast to the keel to form the ribs. Then the heavy arches which were forged and fitted to exact size and proportions to give strength and rigidity to the whole frame, and also for a support of the main deck, are put in place by that mechanical Hercules, the overhead crane. Meanwhile, other gangs are shaping and preparing the plates which form the sides or walls of the steel shell.



BOILERS WAITING TO BE INSTALLED IN THE *CITY OF CLEVELAND*

(Each weighs about eighty tons)



THE PILLOW BLOCKS OF THE BIG ENGINE, WHICH HOLD THE BEARINGS FOR THE MAIN SHAFT

All is hurry and bustle in the shipyard, and one is impressed by the workings of a wonderful system, for all the intricate operations go on like clockwork. From the unloading of the cars of rough material until it is worked into the ship, there is little lost time. The plate comes to the yard marked, according to its quality, to go into a certain part of the ship; the receiving clerk passes it on to the fitter who places on it a template for those particular plates, and marks out the exact outline and each rivet hole, so that when it reaches its place it will fit to a nicety, and the holes so punched will correspond with those already in the frames of the ship.

For the next operation the plates are sent to the shop where are the ponderous machines, which exemplify most vividly man's control and mastery of steel. There are the heavy and powerful punches which with one steady thrust punch the rivet holes; there are great shears which cut the cold, stiff plates as marked by the fitter, as easily as one cuts a piece of pasteboard with scissors; and there are huge rolls which bend them to conform to the rounded shape of the hull. The plates are then passed on to the erectors who fasten them in place with temporary bolts, and who are closely followed by the riveters who rivet everything fast.

The rivets are made of the same material as the plates they bind together, and are cylindrical in form with a pan-shaped head. They are of sufficient length to allow the other end, after being placed in the punched, countersunk holes of the plates, to be driven down to a head. The riveters are very expert in operating the pneumatic riveting machines; and the work goes on rapidly, the familiar *rat-a-tat-rat-a-tat-tat-tat*, the noise of countless blows of incredible quickness, being dear to the heart of the shipbuilders, for as it wakes intenser resounding echoes from the hollow shell of steel, there is the assurance of steady progress in the work at hand. Mechanical science has so improved this feature of shipbuilding that the very

impact of the riveting machines is measured and may be regulated. The operator, knowing exactly the energy of the blows being delivered on the red-hot rivet, is able to gauge his work to a particular degree. The force of man's arm wielding a sledge is indeterminate and it is impossible to deliver two blows in succession each of which will do precisely the same work.

The riveters in turn are followed by the painters who cover all metal surfaces of the hull with graphite paint to preserve it from all corrosive action of water, steam, or acids. And so the work goes on, frame after frame, plate after plate, girder after girder, growing day by day, under the efforts of an army of busy men, into the semblance of a ship's hull, or a huge hive resounding with the clamor of steel on steel.

Looking through the shell of keel, frames, and arches one notices radical departures in model and construction from the earlier steel ships. In those of size to about two hundred and fifty feet in length the keel is not much more than two feet in height, allowing but little space between the outer and cargo bottoms. This renders examination of the plating from within a difficult and disagreeable task. But in the *Juniata* and ships of her class the keel is five feet or more in height, and the frames of nearly equal thickness, thus affording a space nearly sufficient for a man to stand erect. The bottom and sides are built on the cellular plan, divided into numerous compartments with bulkheads made very strong to resist any pressure of water they could hold should one or more be filled through collision or heavy puncture. Greater strength is obtained by this construction, as is perfectly plain in the method of binding together like one huge steel cylinder with double walls, the steel arches acting as girders and supporting the main deck, the frames or ribs, and the keel which is veritably its backbone.

While the army of skilled workers is building up the hull of the vessel, other as important work in its being is

under way on the other side of the yard. In the great engine shops and boiler works are being constructed the propelling machinery and auxiliary engines which are to give the ship life and power, and without which she is a helpless hulk. In the draughting rooms the machinery is designed, and after being approved, the drawings are sent to the shops. The patternmaker develops the full sized patterns of each separate part. These are sent to the foundry where, after a few days, the castings are made and sent to the machine shop. There each piece is milled, turned up in huge lathes, drilled, or planed, and finished ready to be set up to fit exactly in its intended place. The blacksmiths are busy with the forgings, which are also sent to the machine shop and finished for the erectors. This gang of men sets up the engines in the shop, fitting each and every part with its neighbor with the utmost precision, so that, when erected in the ship, all will go together quickly.

The machine shop is, indeed, a busy place, fairly vibrating with stirring scenes, and to one unfamiliar with such things everything seems in utter confusion. Here are the great shafts made of the finest quality steel, some finished, others in the rough, while in an enormous lathe is still another weighing many tons. It is being carefully watched by skilled mechanics as it revolves, nearing completion at every turn. There are also the heavy bed-plates of cast steel and the big cylinders of like material, while a little further on an overhead crane is taking from a machine one of the solid composition propeller blades, just finished. When placed upright on the ground it stands as high as an ordinary man. Smaller parts, such as piston and connecting rods, cross-heads and guides, bushings, levers, and bolts and nuts, are scattered about everywhere, while the steady hum of the machinery bears witness to the amount of work on hand.

When completed there will be a set of vertical, quadruple expansion, screw-propelling engines of two thousand,

five hundred collective horse-power at about one hundred and twenty revolutions per minute. The cylinders are twenty-two, thirty-one, forty-five, and sixty-five inches in diameter by forty-two inches stroke of pistons. They are to be supplied with steam at two hundred and ten pounds working pressure, by four Scotch boilers eleven feet, six inches in diameter, and fitted with Howden hot blast, rating at four hundred boiler horse-power. On load draft the vessel has a normal economic speed of fourteen miles an hour, while a maximum speed of about seventeen miles will be attained.

The boiler shop, as is usual in such places, is in a perfect din, for here are being made the huge boilers weighing fully eighty tons, which, besides furnishing steam for the main engines, also supply the auxiliaries. On one side of the shop the workmen are busy with the smoke-boxes, uptakes, and stacks, and others are working on ventilator cowls, steam and exhaust pipes, oil and waste cans and many other small parts of the equipment.

In the joiner shop carpenters are at work on the fittings for the passenger gangway, the main saloon, dining-room, staterooms, and officers' cabins, while the jointers and planing machines are making the flooring of oak and working up pine for partitions and other purposes. To obtain artistic decorative effects rich mahogany in choice and well selected grain is used very largely in the saloons, and white enamel and gold effects for the chambers *en suite* and the staterooms. The fire hazard, however, has been constantly in the mind of the marine architect, for he has carried the steel construction up to the promenade deck, thus reducing the use of wood to the minimum degree.

After a time a return to the shipyard reveals the progress which has been made on the hull. Instead of the skeleton of ribs, frames, and arches, one finds the structure fully plated up and a painter's gang going over the sides, coating them with black water-proof paint, but leaving the bottom and a narrow strip on the sides to the water line

a bright red. From a little distance it looks like an immense canoe, but conveys an impression of strength and seaworthiness quite foreign to that light, bobbing craft. On the fitting-out dock, under the high shears, are the boilers ready to be placed in the hull, and parts of engines, hoisting gears, pumps, valves, and small parts laid out ready for use.

Climbing the long steep, inclined way, leading through the network of scaffolding about the vessel, one reaches the top, forty feet from the ground, and steps on the ship's deck. Here are new and strange scenes of confusing activity. Gangs of riveters are still busy with their machines building up the steel walls of the spar deck, finishing the hatchways, and other metal work. Peering down through a funnel and ventilating hatch, one may get some idea of the width and depth of the cargo hold. It only increases the curiosity to explore the cavernous depths. By a handy though uninviting ladder a descent is cautiously made for thirty-odd feet to the inner bottom.

The hold, forward of the engine bulkhead to the forepeak, is divided into several compartments by water-tight bulkheads of steel, to prevent foundering in the event of collision or other accident. As cargo space is an all-important consideration in designing freighters of this class, the engine and boiler compartment and coal bunkers are placed well aft. This arrangement insures an easier handling of package merchandise from the hold to the main deck and thence to the wharf.

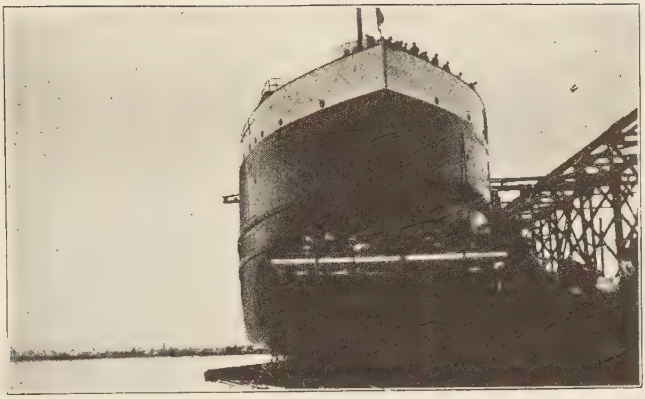
A convenient doorway in the engine bulkhead admits one to the mechanical compartment. First there are the foundations for the boilers and the coal bunkers, and a little further on the engine beds are being bolted to their steel foundations, with the thrust and line shafts already in place. In a few days the big boilers, and heavy engines in sections, will be swung aboard by the towering arms of the shears; and the auxiliary machinery, such as condensers, steam pumps, hoisting gears, and electrical plant,

will be placed in position and connected up. Finally, the screw propeller and rudder are swung up under the overhanging stern and secured to the tail-shaft and sockets.

In the shipyards of the Great Lakes it is the general practice to launch vessels sideways, instead of stern first as elsewhere, therefore the ships are built parallel to the stream or slip and at the very edge. Under the ship at intervals of eight or ten feet are heavy, smooth timbers, extending from the edge of the stream and sloping backward at an easy angle, to form the ground ways. On the eventful day regular construction work in the shops, excepting in the moulding room, and on other vessels is suspended, for all hands are needed beneath the ship to prepare the launching ways. The utmost care is necessary that this work be properly done, and to those in charge and upon whom rests the responsibility, it is an anxious time.

Early in the morning hundreds of men are building up the cradles under the ship, their base resting on the smooth ground ways, which are greased with tallow, the tops of the cradles bearing up against the ship's bottom. When all the cradles, which are made of twelve-foot timbers, a foot or more square, are in place in two long rows, wooden wedges, which have previously been set, are driven home. The hollow echoing thud of the many sledges resounds through the yard, the operation slightly raising the heavy mass of steel, and the shores and blocks, upon which the vessel has rested during the months of construction, are knocked away.

The ship, resting on the cradles and they on the smooth ways, would slip at once into her native element, but for checks placed at stem and stern. These are five stout lines passed under the ship with one end secured to the end of long triggers holding the cradles to the ways, the other end running back over a flat timber, and drawn taut by block and tackle. At last everything is in readiness for the interesting event, made doubly so on this occasion



THE *CHARLES WESTON* ONE MINUTE BEPORE LAUNCH

THE LAUNCH

The Power House, Soo Locks

Under the stern of the *Charles Weston* just before launching

because the new liner is the largest and fastest yet built for the combined tourist and freight service on the lakes.

A few minutes before the hour set for the launch the party, composed of the owners, distinguished citizens, and pretty women, arrives at the yard and assembles on the launching stand. This has been gayly decorated with bunting and flags to be in keeping with the spirit and enthusiasm of the occasion. The Stars and Stripes are then unfurled to the breeze from the after flag pole, the ship's burgee slips out from the foretruck, and a pennant high above. The customary bottle of champagne, tied with a delicate ribbon in strong contrast to the huge, black hull towering above, is hung from the upper bow. The sponsor poises it in air while holding in her other hand a bunch of bright roses, and is the central figure in the event. All then being ready, the party waits with bated breath, and the throng of spectators below with eager expectancy.

Then for the final act. The signal is given to cut away. Five axes in the hands of as many brawny men on the ground below, and as many at the stern, come down on the lines with terrific force, — they are cut through by the single blow, — the triggers snap back with a sharp crack, — and the huge vessel is free. For a second or two she hesitates, as if to make up her mind whether she wants to be launched or not. Then, with a shout from many throats, "There she goes," she starts slowly, the bottle of champagne is shattered against the steel, the christening words are spoken, and thus freed she slides bulkily down the ways, and careening slightly, plunges into the stream. A mighty wave, almost as high as the sloping deck, rises, sweeps across the narrow inlet and dashes its unspent force against the docks there. The ship rights quickly, straining at the lines as if impatient to begin at once her maiden trip.

To make the event still more interesting and to insure the ship's good fortune on the sea, the gladsome shouts

of the people are taken up by multitudes of whistles, from the shipyard, from factories near and at some distance too, from steamers and tugs and private yachts, attracted to the scene. In a few minutes, however, the loud screeches die away, the ship rests easily in the stream, and the interest of the day is over.

Not so, however, for the builders; and the owners — in the case of the *Juniata*, the Erie and Western Transit Company — are anxious to get the ship completed and in commission at the opening of navigation, in order to make the full quota of trips during the season. There is much work yet to be done, — the boilers and engines must be installed, smoke boxes and funnel set up, numberless steam connections made, the joiner and cabinet work finished, and touches here and there for machinists and painters.

In about three months after the launch the ship is ready for her steam trials at dock. The order is given to get up steam. Water is pumped into the boilers, fires are lighted in the furnaces, and in a little while steam is popping merrily from the safety valve. Then, at the usual signal, the throttle valve is opened ever so little, steam rushes to the cylinders, the pistons move slowly and smoothly, the cranks turn and the screw revolves, giving proof of the care, skill, and attention that has been given throughout, from the inception of the design to the tightening of the last bolt.

After readjustment of the machinery where needed, coal and stores are put aboard, the builder and consulting engineer for the owners appear, and she steams away for a trial spin in mid-lake. She may cruise about for several days running under all conditions of weather and sea. The engineers are watching for and noting any indication of weakness or of undue strains in hull or machinery. Their inspection is carried to the smallest machine and the connections tested; in fact, nothing escapes them. Her behavior in answering a quick helm under all condi-

tions by the action of the steam steering gear also comes in for exhaustive tests. When she steams back into port the experts are ready with their report, but the tuning up process goes on for probably a week or two longer. The furnishings for the staterooms, the table linen and silver ware, provisions, and other supplies having been taken aboard, the new liner is ready for her first trip in service. With the receipt of the engineer's report that the ship is ready for sea, she has cost her owners, all told, fully five hundred thousand dollars.

CHAPTER XXI

THE QUEEN OF THE WORLD'S LAKE CRAFT, THE *CITY OF CLEVELAND*

LAUNCH AND DESCRIPTION — BUILDING THE ENGINES AND BOILERS — ASSEMBLING OF PARTS — THE INCLINED CYLINDER ENGINE — ITS ADVANTAGES — HIGH EFFICIENCY — HISTORY OF THE DETROIT AND CLEVELAND NAVIGATION COMPANY, ROUTES — THE CLEVELAND AND BUFFALO AND CLEVELAND AND TOLEDO LINES, STEAMERS, ROUTES, AND SO FORTH.

THE launching of a great ship is always a novel and thrilling sight, and can hardly fail of being highly instructive to the landsman in numerous points of marine architecture. Even though the long anticipated event be scheduled for a midwinter day, it should not be passed on that account, and it is well worth travelling many miles to see. If the vessel thus cast into its natural element is of the modern passenger type, the graceful lines of its finely moulded hull change continually, as the spectator on the ground moves from one position to another. From bow to stern the study in curves, of the smooth easy outlines to the short well-rounded bulk of the waist section, is pleasing to him as to the old "sea dog."

To the old salt and to the fresh-water sailor the huge, bulky, and deep-hulled ships of the ocean, and the clumsy freighters of the Great Lakes of large cargo capacity, are likened unto that denizen of the deep, the strong and powerful whale — the giant of the fishes of the sea. Their great-boned frames with the strength of steel sinews and almost impenetrable skins, are comparable with the stout frames of steel, the keel, ribs, and arches, and the double bottoms of the modern liners. Again, the powerful warships of the nation are likened unto that

stealthy pirate of the sea, the crab. Its broad, short body covered with a stout shell and with grasping tentacles, is in imagination quite like the heavily armored battleship with its bristling guns, boat hoists, and outstretched booms. And how easily the imagination follows to the graceful and sharp-prowed passenger steamers, which may be likened unto the mackerel, the most active of oceanic fishes. These long and slender fish, it is said, have hardly two bones of the same size and shape; and, intended for speed, they are entitled to the distinction of being the racer of the sea. The ships designed for fast passenger and express service on the Great Lakes are modelled on easy lines, tapering to bow and stern, from a somewhat narrow waist section, suggesting the proportions of the mackerel. It was of the utmost interest at the launching time of the last leviathan of the lakes to know that there are not two ribs or frames exactly the same shape or size, on the same side of the frame, the mate of each on the opposite side, however, being identical.

Such a ship, towering high on the smooth ways, stood ready for its baptism in the waters of Detroit River. It was a perfect winter day, a cloudless sky, and the sun, shedding its slanting rays beneficently on the scene, seemed to form a coalition to render the notable event a memorable one in the annals of shipbuilding on the lakes. Precisely at noon the launching party assembled on the stand at the ship's bow; a red burgee was unfurled from the foretruck, and the ship's name, *City of Cleveland,* was thus announced to the public for the first time. At the same instant the launching signal was given. Six stout lines which held the big mass of steel on the smooth ways were cut and the ship was free. With a splash of champagne on the bow the christening words were spoken, and the ponderous hull glided down the short ways. A great wave higher than the ship rose, with spray thrown high in the air, and the largest side-wheel steamer on the lakes

made her first dip in fresh water. There was a mighty shout from thousands of throats and noisy shrieks of many whistles, heralding the auspicious event.

This large and luxurious passenger steamer was built by the American Shipbuiding Company, at the Wyandotte yards, for the Detroit and Cleveland Navigation Company, and she plies between those cities, making night and day trips. The dimensions are: length, four hundred and four feet over all, three hundred and ninety feet keel; fifty-four feet beam; ninety-two feet, six inches width over the guards, and twenty-two feet depth. Aside from the size of the ship, the more notable features which appeal to all travellers are the new and improved devices for their safey and comfort, and also the magnificence of the decorations and furnishings. Every convenience that an ingenious mind could suggest has been installed to make the night trip across Lake Erie, or the six hours' day trip, the most enjoyable of all short voyages on the lakes. The cost of the ship complete in every detail exceeded one million and a quarter dollars.

The hull is constructed of mild steel up to the main deck rail, including the main deck, which is sheathed with wood to deaden the noise of loading and unloading baggage and express matter. All the deck houses and paddle-wheel housing are constructed of steel, thus insuring the portion of the ship immediately above the boilers and engine against fire from that source. The hold is divided into ten compartments by water-tight cross bulkheads of steel. The double bottom is also divided into twelve compartments arranged to carry water ballast when it is desired to change the trim or draft of water of the ship. On the guards are fitted two tanks, one on each side, of twenty-five tons' capacity, to control the athwartship trim; and in the hold just forward the waist is a one-hundred-ton tank to steady the ship in a beam sea. Powerful pumps are fitted for filling and discharging the tanks quickly. For the absolutely safe control of the ship there

CITY OF CLEVELAND

Steamer *Western States*

are three complete steering gears, all operated by steam, two of which are fitted to the rudder, while the third is connected with a rudder in the bow to facilitate manœuvring in the narrow stream at Cleveland, and in moving to and from the various railroad and fueling docks in the Detroit River. This is easily accomplished without turning about. To accommodate the full capacity of four thousand, five hundred passengers, there are seven decks, namely, orlop, main, saloon, gallery, promenade, upper, and trunk. All of these decks, excepting the trunk or topmost deck, are connected with an electric elevator.

The designer of the splendid vessel was Frank E. Kirby, the famed master of the difficult art of shipbuilding, who in a busy career has planned many of the floating palaces of the Great Lakes, and has to his credit the design of the Hudson River day boats, the *Hendryk Hudson,* and *Robert Fulton,* the latest addition to the same line. Louis O. Keil, who was the decorator of the *Hendryk Hudson,* was given the task of beautifying the new *City of Cleveland.*

Four broad gangways are provided on each side to permit of easy handling of several thousand tons of express matter. The passenger entrances are aft of the wheels, with a wide opening into a large lobby which gives access to the purser's and steward's offices, and the baggage room and dining-saloon. From the lobby a broad, grand stairway leads up to the main saloon which extends through three decks.

One of the leading features of the main saloon is the mantel and fireplace located in the amidship section and connected with the forward smokestack. This feature adds much to the cheer of the saloon, and comfort of the passengers on dreary and stormy days in October and November, the navigation season being extended to about December tenth. A large assembly or convention hall is placed on the promenade deck amidships, and is designed to accommodate committees and delegates in their meet-

ings, on the way to the convention City of the Straits. This room is finished in Circassian walnut, the walls and a highly decorated dome being finished in the style of the Elizabethan period. The staterooms, three hundred and forty-two in number, are all on the saloon, gallery, and promenade decks, and access to them is provided for by double galleries extending around the main saloon with numerous exits leading to the various decks, which are kept in constant communication by the elevator service. The staterooms are large and conveniently arranged. Every room is supplied with lake water, both hot and cold, under pressure.

Twenty splendid parlors border on the main saloon. All upholstering and furnishings are of the most tasteful and luxurious character and in perfect keeping with the colors of the rooms. A bathroom connects with each parlor; and some are equipped with shower baths. Probably the most pleasing feature of the parlors located at the forward end of the promenade deck is the arrangement of a series of private verandas opening from the parlors, and enclosed from the other parts of the outer deck. This is accomplished in such a way that parties occupying the parlors may be entirely secluded though having a full and clear view outward over the water.

In every stateroom there is a telephone connected with the main office, and when the steamer is at dock, she is always connected to ten lines of the city telephone exchange. This innovation is greatly appreciated by travellers between the two cities, and in fact from distant points. Upon awakening in the morning at either city, it is a simple matter for one to call his home, and without leaving the stateroom tell of his safe arrival in port. Business appointments may thus be made before breakfast and without the least trouble or delay. The ship is also equipped with the wireless telegraph apparatus, so that business and private messages of importance may be sent to any of the principal lake ports while the steamer

is *en route*. Nearly all the telegraph business of the navigation companies of the lakes is now done by the wireless telegraph, and package freighters and the ore and grain ships are rapidly being equipped with this improved service.

The dining-saloon is located on the orlop deck — the one just below the main deck — and is easily reached from the lobby by broad companionways, and also by the elevator. It is seventy feet long and extends across the width of the hull. The furnishings are most elaborate and complete. Two private dining-rooms are located forward of the main saloon, and aft of this is the buffet, furnished in a style that is an entire departure in steamship decoration. This room is given a Venetian garden effect. Heavy ceiling beams with lattice work entwined with vines are supported by massive columns, while the floor is laid in large, Venetian red tile. The side walls are decorated with landscape paintings and hidden electric lamps of soft blue cause the ceiling to resemble the famous Italian skies by moonlight. The seats and tables are of appropriate style.

The furnishings for the cabins, staterooms, and dining-saloon are of liberal quantity and comprise fifty-five hundred yards of carpeting, two thousand mattresses, four thousand sheets, and pillow cases of the same number, two thousand blankets, five thousand towels, thirty-four hundred pieces of silver service, sixty-five hundred pieces of china, and three thousand napkins.

An additional protection against fire, aside from the usual equipment required by the United States steamboat laws, is provided in the complete sprinkler system leading to the fire holds, main saloon, and wing passages, together with a thermostat automatic alarm system in every room, which will give alarm in event of fire. Any part of the ship breaking out with fire would be immediately flooded before the regular fire apparatus could be brought in play by the crew. The entire ship is ventilated with

cool, fresh air, and a vacuum cleaning system is provided for removing dust and dirt from the carpets and furniture.

The motive power which propels the great ship at a normal economic speed of twenty-two to twenty-three miles an hour is of much interest. The maximum speed is not less than twenty-five miles under favorable conditions, and has earned for the ship the distinction of being the fastest vessel on fresh water. The engine is of the inclined three-cylinder compound type, driving feathering paddle-wheels connected direct to the main shaft. The high-pressure cylinder is fifty-four inches in diameter and is placed between the two low-pressure cylinders, which are eighty-two inches in diameter, and of eight feet stroke of pistons. The cylinders are fitted with Corliss valves and gear. The immense paddle-wheels are twenty-eight feet in diameter, and the feathering paddles are fourteen feet long and four feet wide.

A visit to the busy machine shop of the shipbuilding company at the time the great engine was being assembled proved of absorbing interest. Almost in the centre of the shop two of the immense cylinders were being placed in position on their bed of cast steel. The huge low-pressure cylinders weigh twenty-three tons each, and are large enough to permit of a good-sized truck horse being driven through the bore, or a seven-foot giant could stalk through the tube by slightly inclining his head. The high-pressure cylinder weighs seventeen and one-half tons. A little further along were the great pillow blocks, and scattered about in what seemed endless confusion were bearings for the heavy shaft, connecting rods, valves, bolts, and nuts. Many machinists were busy fitting together the heavy parts of the big engine, every single piece being machined to fit exactly in its intended place, so that when completed the utmost power, eight thousand, would be developed.

In the forge shop was the main shaft, in keeping with

the monster cylinders. The shaft is seventy feet long, twenty-four inches in diameter, and weighs in its entirety seventy-four tons. Each of the outboard sections weighs twenty-nine tons, and the centre portion with the huge cranks weighs sixteen tons, which gives some idea of the proportions of the ponderous mechanism. Skilled mechanics were at work in other departments of the works constructing the auxiliary machinery, which consists of compound feed pumps, fire pump, sanitary pump, fresh-water ballast pump, hot draft and ventilating fans, double steam steering gear, two gypsy capstans, one deck capstan, and a combined steam windlass and capstan. Two air bilge and cooler pumps are connected to and worked by the low-pressure engine. A hand reversing gear is installed as is also a Nicholson log. There is also an electric lighting plant of two thousand lamps and powerful searchlight.

In the boiler shop there were being constructed the cylindrical return tube boilers, of which there are eight. Four of them were completed and moved out on the dock ready for the giant shears to pick them up one by one and lower them into place in the hull. The boilers are thirteen feet, nine inches in diameter and twelve feet long, and weigh about eighty tons each. They are each of four hundred boiler horse-power, and are provided with two furnaces fifty-two inches in diameter and fitted with Howden hot draft. They are allowed a working pressure of one hundred and sixty pounds. The boilers are placed in the ship in two separate water-tight compartments, each battery of four boilers having its own bunkers and ash ejectors. This is an important arrangement, for in the event of one compartment being flooded from any cause, the other battery of boilers would still be in steaming condition for service, and would be sufficient to drive the engines, though at greatly reduced speed. Two smoke-stacks are fitted, each one hundred and two inches in diameter and seventy-five feet long.

Captain Alex J. McKay, the commodore of the Detroit and Cleveland fleet, commands the splendid new steamer, and the junior officers are appointed from the roll of honor men in the company's service. Under their guiding care the majestic steamer, the *City of Cleveland,* contributes a greater meed to the popularity of the lake trip between the "Forest City" and the "City of the Straits."

The Detroit and Cleveland Navigation Company, like the great navigation company of the St. Lawrence River and Lake Ontario, from its early days, has been an exponent of the side-wheel type of steamboat; and to them more than to all other vessel owners is due the present high development of this old and interesting class of vessels. Fulton's first model, and the successful *Clermont,* it will be remembered, were of this principle in the application of power; and for nearly forty years no other means of driving a steam vessel was devised. In later years when the vertical engines used in the larger steamboats had reached the limit of improvement, the more economical propellers nearly drove the side-wheelers from the lakes. But the adoption of the horizontal engine of an improved high-pressure type in a measure changed the trend of marine development, so far as steamers for passenger and express service were concerned. It is possible, if not highly probable, that the inclined cylinder engine of the horizontal type will have a large bearing upon the perpetuation of the side-wheel steamer.

The most important feature of this improved engine is its almost total absence of vibration, especially when running at high speed. This very desirable quality is much appreciated by nervous and sleepless travellers, and gives greater enjoyment to voyagers of the lakes. The smooth-running and silent engine communicates to the feathering paddles a steady, uniform, and powerful motion, free of the jerking, wrenching, and uncertain action inherent to the high walking-beam type. It eliminates

the annoyance of the constant pounding and creaking of timbers, which were so characteristic of the old-time steamboat. The machinery of the modern side-wheeler is placed low in the hold, with scarcely any heavy parts above the main deck; and it is very powerful and capable of sustained effort. It is not too much to state that any one of the latest Lake Erie steamers, equipped with the inclined engine, is capable of a sustained speed of at least twenty-three miles an hour, from one end of the lake to the other. The *Eastern States,* the *Western States,* the *Tashmoo* and one or two others have this type of engine. There are no screw steamers on the lakes to-day which can equal them in speed, seaworthiness, and stability in storms. It is interesting to recall the fact that the old gunboat *Michigan,* which has plied the lakes for sixty-seven years, has an engine of this type, though of the low-pressure kind, and, of course, of relatively small power. It was constructed in Pittsburg at the time the old vessel was being built, in 1842–43, and is said to be in as good working condition as when installed. The mechanics of those days must have been skilled and careful and patient workmen, for there was little of the modern help of machinery, and most of the work was done by hand.

In the early days of this well-known line, which go back to 1849, the only route covered by it was between the cities of Detroit and Cleveland. The terminal ports evidently suggested the name and, as the Lake Erie division has always been the main line, the original name with but slight variation, has clung to it. The original Detroit and Cleveland Company began operations early in 1850, with the initial steamboats *Southerner* and *Baltimore,* which were continued on the line for two years. These were wooden steamers, one hundred and seventy feet in length, twenty-seven feet beam, and eleven feet, six inches depth, but were hardly adequate for the increasing traffic which came to the line. There next followed

larger wooden steamers, the *Forest City* and the *St. Louis,* which ran on the route in 1852. They were of dimensions, one hundred and eighty-five feet in length, twenty-seven feet beam, and twelve feet, six inches depth. The steamer *Samuel Ward,* about the size of the original steamers, was also operated on the day trip.

Late in the Fall and Winter of 1852 the first steamer to bear the name *City of Cleveland* was built, and, with the steamer *May Queen,* operated the line for a number of years. In 1855 the steamer *Ocean* was added to the line and continued in service until 1862, when the decline in the lake commerce, due to the war, retired it. The steamer *Morning Star* was running on the Cleveland route that year, and the *City of Cleveland* a part of the season. From 1863 to 1867 these steamers maintained the line. With the return of prosperity and increased commerce, after the termination of the war, the company built a still larger steamer and named it the *R. N. Rice.* It was named for the general manager of the Michigan Central Railway, the rail route to the West, with which the steamer line had close traffic arrangements.

The first disaster in the history of the Detroit and Cleveland Company occurred on June 20, 1868, when the *Morning Star* collided with the bark *Cortland,* with a loss of twenty-six lives. It was replaced on the line by the steamer *Northwest,* a large and fast steamer of twelve hundred tons, built in 1866 for the Chicago trade. The *R. N. Rice* and the *Northwest* ran on the line until 1877. In that year the former steamer was partially burned, and the steamer *Saginaw* took its place for the rest of the season. These were the days of wooden vessels, for iron in shipbuilding was little used as yet. It was more costly, as a first consideration, the white oak timbers still being obtained in abundance from the Michigan forests, and wood was believed to be the better material.

In the Winter of 1877-78 the company undertook the construction of a steamer to replace the *R. N. Rice,* and it

was built of wood and iron in combination. When launched it was named the *City of Detroit,* and was the largest and finest steamer yet operated on the route. At that time the company adopted the practice of naming its steamers for the prominent ports, and they have continued it since. The new steamer had a length of two hundred and fifty feet, a beam of thirty-six feet, and was fourteen feet, six inches deep, registering nearly one thousand tons. The *City of Detroit* and the *Northwest* maintained the line until 1883. In 1880 the company adopted the use of iron in the construction of its future vessels, and that year built and launched the second *City of Cleveland,* entirely of iron up to the main deck. It was somewhat smaller than the *City of Detroit,* measuring two hundred and thirty-five feet length and thirty-two feet beam; but both of them are still in service, though operated under different names.

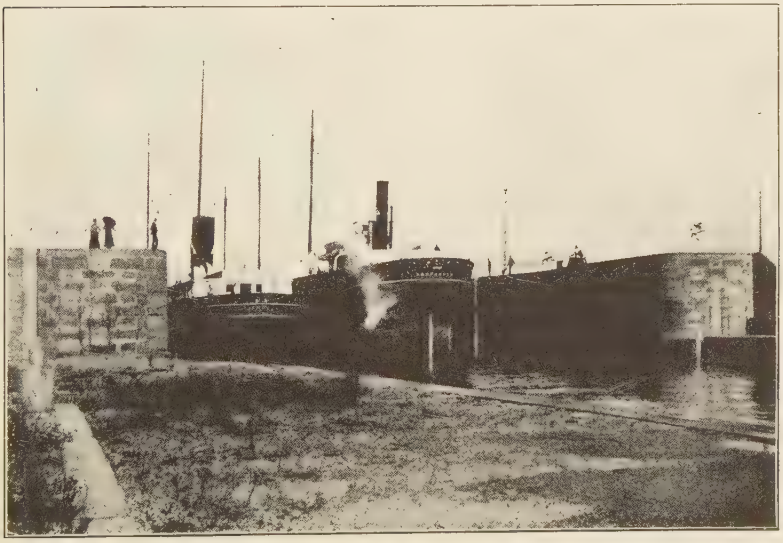
Along in the early eighties the increasing lumber trade of the Lake Huron shore caused small booms in the logging towns of that district, and opened up a considerable business with the outside world. The Detroit and Cleveland Company did not neglect the opportunity, for it built, in 1883, the steamer *City of Mackinac,* and established the Coast Line from Detroit to Mackinac Island and St. Ignace, with stops at all the important ports along the Huron shore. The new steamer was constructed of iron, and of dimensions, two hundred and fifteen feet length, thirty-two feet beam, and eight hundred and seven gross tonnage. Three years later the second *City of Cleveland* was overhauled and renamed the *City of Alpena,* and added to the Coast Line. These steamers maintained this route until 1893. In that year the company built and commissioned two new steamers with gallery decks, especially for the Coast Line, the new *City of Mackinac* and the new *City of Alpena,* which have maintained the line since. Their dimensions are: length over all two hundred and eighty feet, sixty-nine feet width over the

guards, and register seventeen hundred and thirty-five gross tons.

By 1886 the steamers on the Cleveland route had become inadequate for the growing traffic, and to keep pace with the times, the company had constructed the large and fine steamer, the third *City of Cleveland*. It was of one thousand, nine hundred and twenty-three tons' register, and measured two hundred and eighty-five feet length, forty feet beam, and was the fastest steamer of the rapidly growing fleet. A departure from the accepted arrangement of the lake steamers of this class was taken in building a second berth or gallery deck and raising the trunk deck above that, so that the main saloon extended upward an additional ten feet, affording almost double the sleeping accommodations of the old steamers. As this new steamer was much superior in every respect to the old *City of Detroit,* which hardly balanced the line, and because sister ships of uniform size, accommodations, and speed were desired for the main line, the company decided upon the construction of the new steamer *City of Detroit*. She was launched early in 1889 and, when placed on the route to Cleveland, was hailed as the largest of the lake fleet. It was the marvel of the marine world, and for twenty years has run on the line through fair weather and storms on regular schedule, during nine months of the year. It is the second largest steamer of the fleet to-day, and measures three hundred feet in length, and forty feet beam, and registers nineteen hundred and nineteen tons.

When the third *City of Cleveland,* built in 1886, was displaced in 1908 by the new *City of Cleveland* already described, its name was changed to *City of St. Ignace.* It was operated that year as an extra express steamer running from Detroit to Mackinac Island, on fast schedule, with but one stop, at Alpena, and made three round trips weekly, exclusively for the accommodation of through and Alpena travellers. With the large and luxurious

In the upper Weitzel Lock, St. Mary's River Canal



Freighters entering the Poe Lock, St. Mary's River Canal

A Blockade in Detroit River above Ballard's Reef
A Freighter aground in the narrow channel

The *Wissahickon*

steamers *City of Mackinac* and *City of Alpena,* of practically the same size and speed, she forms a homogeneous division for the Coast Line. In 1909 the *City of St. Ignace* extended the run to Cleveland, making two round trips weekly, stopping at Goderich, Ontario, on one trip each week. The old *City of Detroit* was known for some years as the *City of Detroit No. 2,* and was operated on a line from Chicago to eastern shore ports on Lake Michigan. It remained there only two or three years, and was brought back to its native waters and held as a reserve steamer for the fleet.

Prior to 1893 there was no daily line of steamers operating between Cleveland and Buffalo, but in that year the Cleveland and Buffalo Transit Company was organized, partly by the owners of the Detroit and Cleveland Company and capitalists of those cities. The original steamers on the Coast Line were rebuilt, refitted, and renamed the *State of New York* and the *State of Ohio,* and placed on the route, making nightly trips. The line proved so profitable and the traffic so heavy that, as the old steamers were too small to take the natural increase, the company in 1896 built the magnificent steamer *City of Buffalo,* of greater dimensions than any passenger steamer on Lake Erie. Two years later another and still larger steamer was added to the line, the *City of Erie,* which is now in service. She is three hundred and sixteen feet in length, forty-four feet beam, and registers twenty-five hundred gross tons. In 1900 the steamer *City of Buffalo* was greatly enlarged to dimensions three hundred and forty-one feet length, seventy-five feet width over the guards, and now has a gross tonnage of twenty-nine hundred and forty.

In 1896 and 1898 when the first steamers on the Cleveland-Buffalo line were displaced by the new and larger ones, the *State of New York* and the *State of Ohio* were placed on a new route between Cleveland and Toledo, touching at historic Put-in-Bay, on day trips.

Every evening during the Summer these steamers gave moonlight rides on the lake from each of the terminal cities, and they have been popular steamers wherever they ran. About 1893 the old steamer *City of Detroit,* built in 1878, was renamed the *City of the Straits,* and ran on side routes for some years. In 1906 she was partly rebuilt and placed on the Cleveland-Toledo line, replacing the *State of New York,* a smaller steamer. The latter was leased for several seasons to the Cleveland and Buffalo Transit Company, for service between Buffalo and Crystal Beach, a resort on Lake Erie. In 1908 the *State of New York* was placed on a new line established between Detroit and Saginaw, making semi-weekly trips. She is the smallest of the Detroit and Cleveland fleet, just about one-half the size of the new *City of Cleveland,* but is still a popular and traffic-producing factor of the company. By 1909 the increasing traffic between Cleveland and Buffalo for the water lines necessitated the placing of the steamer *State of Ohio* on that route, making day trips, up one day and back the next, with stops both directions at Erie, an important port about midway between the large cities. Since then the Cleveland-Toledo line has been served by the steamer *City of the Straits* alone, covering the route on alternate days.

CHAPTER XXII

THE SIX-HUNDRED-FOOT ORE AND GRAIN CARRIERS

Enormous Traffic through Detroit River — Unique Types of Lake Steamers — Views of Salt-Water "Tar" — Design of Six-Hundred-Footers — Construction and Equipment — Dangers of Lake Navigation — The Pittsburg Steamship Company — Its Fleet — The Gilchrist Steamers — The Tomlinson Fleet — The United States Transit Company — Hawgood Fleet — Cleveland-Cliffs Company — Wilson Transit Company — Pickands, Mather & Company — Other Fleets.

THE good citizens of this country who, with an exalted sense of patriotism, are worried over the disappearance of the flag of the American merchant marine from the seas, should find some consolation in the fact that considerably more than one-third of all the American tonnage is represented by the Great Lakes shipping, and that the lake tonnage has increased sixty-nine per cent in the last ten years. More than half of the tonnage constructed in 1907 was on the lakes; and, of the seventy-five vessels of various types put into fresh water, with an aggregate tonnage exceeding three hundred thousand, fourteen were giant ore carriers from six hundred to six hundred and six feet in length, fifty-eight and sixty feet beam, and thirty-two feet moulded depth. The cargo capacity of these ships is nearly twenty thousand tons of ore or coal on a draft of twenty-four feet, but, as the present channels in Detroit River, the St. Clair ship canal, and the long rock-cuts of the St. Mary's River afford a maximum depth of only twenty to twenty-one feet, their capacity is reduced to about fourteen thousand tons, or in the grain trade to about four hundred thousand bushels.

The steamer *J. Pierpont Morgan* with a length of six hundred and five feet, five inches, is representative of this type, and in a single voyage carries a cargo equal to the combined capacity of every boat of every description that floated on Lake Superior at the beginning of the Civil War, every steamer, every sailing vessel, every barge, every bateau, and every canoe. On the day the *Morgan* was launched her captain, who had been detailed by the owners to bring her out, stated that it would require every regular trip of the first steamer he commanded twenty-eight years before, for two and a half years, to carry from Duluth to Cleveland as much ore as would be carried by the new monster on her first trip.

The American people have little realization of the enormous traffic of our Inland Seas, and some of the inhabitants of the lake States and of the Middle West may not know that the commerce of these great water highways now exceeds eighty-five million tons annually,—all carried in a navigation season of about two hundred and forty days. Figures dealing with statistics are but cold evidences of fact at best, and generally give but vague ideas as to volume and extent. If those who seek the more convincing evidence of sight should spend a few hours on the wharfs along the Detroit River front, which faces the world's greatest water highway, they would witness the finest parade of shipping to be seen on the continent. They would look upon two processions, one moving up, the other down the stream, almost without interruption, and representing the greatest traffic in tonnage and value of freights that traverses any marine highway in the world. If the observers chose a day at the height of the navigation season for their object lesson, and remained at their post for twelve hours, they would see as many as one hundred vessels or even more, of various types and all of the utmost interest, passing in the busy stream, on an average of one vessel every six minutes of the time.

There would be the old-timers, the "rabbits" or "coffins," with their little cargoes of salt, coal, or stone; the lumber "hookers" and barges in tow with their high deck-loads of lumber, shingles, lath, or posts, and occasionally a schooner or lighter towed by a puffing tug. A whaleback and barge would surely pass during the day, either bound down with iron ore, or upbound with coal to the Superior ports. Out of the haze of the lower river stanch modern liners, looking very trim and bright, would appear, their decks crowded with lake tourists. Then, the huge passenger steamers of the express and mail service would be arriving and departing at almost every hour of the day, while the glistening white excursion steamers pass in and out at all times with their complement of travellers to and from Lake Erie ports and Lake Superior. Out in the stream the hurrying ferries, which form the connecting link between the two nations, would be seen patiently bucking the swift current in their regular ten-minute schedule over the half-mile course. Others, too, larger and speedier, would be on their way joining the city with its beautiful island park, Belle Isle, of which there is no counterpart in all America. There would be scarcely an interval in the passage back and forth of the giant car ferries, transporting the commerce of five trunk lines of the iron trail. In this great display of shipping, both up and down, many steel ore ships of the four hundred and five hundred foot class would be hurrying to and from their terminal ports; and, if fortune favored the observers, they would see one or two of the modern leviathans — the six-hundred-footers. The never-ending panorama is greatly enlivened by the presence of the steamers bearing the immense passenger traffic of the straits which, in the navigation season of 1907, amounted to seven million, eight hundred thousand persons for the port of Detroit alone. It is a marvellous fact that of this large number not a single life was lost, nor was it even necessary to bring a life preserver into

use. In this age of rapid transit, travel on the Great Lakes is the safest mode of conveyance Americans have.

In a single season of navigation the number of passages reported was nearly thirty-eight thousand, about ten times more than was recorded for the Suez Canal, while the aggregate of the cargoes exceeded sixty-seven million, two hundred and fifty thousand tons, an amount far greater than that borne by all the ships, British or foreign, entering the ports of Great Britain in an entire year. It also exceeded the total merchandise tonnage entering the harbors of New York, Boston, Philadelphia, Baltimore, Charleston, and Savannah combined. The lake shipping that year effected a saving to commerce of eighty-nine million dollars, represented by the difference between the lake freights and the tariff exacted by the railroads.

To transport such a vast quantity of freight, made up largely of coarse, heavy commodities such as ore, coal, and grain, ships of special and unique types, as viewed by seafaring men, have been evolved. The lakes have presented their own peculiar problems to the navigator, and the naval architect, breaking away from the traditional forms of sea-going ships, has produced new ones better adapted to the needs, but of rig, shape, and proportions calculated to stir the blue-water sailor to astonishment or scorn. His idea of what a lake vessel should be is very apt to be formed by the types he had sailed on the ocean; and, anyway, sailing on water that is fit to drink cannot properly be called navigation, according to his earnest belief. An old Gloucester tar, grizzled and well seasoned, was once cajoled into taking a look at the Inland Seas, and upon surveying one of the new six-hundred-footers, delivered himself of feelings thus:

"Now clap your eyes on that. D'ye call that a ship? Such a rum-looking craft, why, d'ye know, a loggy harbor lighter with a tenement house on one end and a match factory on t'other would look better than that. How 'd the cap'n and chief engineer ever get acquainted? And what if one or t'other

wants to borrer a chaw of tobaccer from the other. I 'll be blowed if he would n't have to make a half-day's run to the other end to get it. And you say the skipper bunks in that skys'l-fo'c'stle forrard, while the cook and the ship's boy has the quarter-deck? Well, I would n't ship as rope-yarn on such a bloody drogher."

Nevertheless, the six hundred feet ore carriers and numerous other smaller ships of similar proportions and design are better suited to the requirements of the lakes' service than any other types would be. The long sweep of deck, clear of spars and superstructure and pierced with hatches from one end to the other, admits of the utmost rapidity in taking and discharging cargo. With an ore chute delivered at each of her twenty-four to thirty-six hatchways, the largest ship will load in two hours, and five to ten hours' work of the huge "clam-shells" (unloaders) will clear her hold. There are no sailors on the lakes to-day, for navigation is reduced to a mechanical science, all the work being done by machinery which has been invented and brought into general use within the last eight or ten years, and which requires for its operation, in a modern vessel, anywhere from thirty to forty engineers, machinists, and firemen. The ore docks, built especially to accommodate the new ships, are equipped with rapid-handling machinery of the latest type, and so keen is the rivalry between them that new records have been established time and time again, only to be broken a little while after by some other dock. At the ore-shipping docks of the Great Northern Railway at Superior, one of the huge freighters took in five thousand, two hundred and fifty gross tons in thirty and one-half minutes, which is at a rate of ten thousand tons an hour. It is hardly probable that this performance will stand as a record very long, but it serves to illustrate the progress of one phase of the lake shipment of ore and coarse freights. The Great Northern ore docks are seventy-three feet above the water level, sixty-two and

one-half feet wide, about a half-mile in length, and have a storage capacity of eighty-seven thousand, five hundred tons.

In designing the vessels of the lakes the chief problem is to provide requisite strength, considering at all times the disproportion existing between the length and beam, and the slight depth of hold rendered necessary by the shallow channels of the connecting rivers. All the well-founded principles of shipbuilding have been ignored by the marine architects of to-day in giving a ship six hundred feet in length and fifty-eight and sixty feet beam, a depth of only thirty-two feet. The constructors have had to bear in mind the quick, choppy seas raised by the gales of the upper lakes, in which the strength of the big ships is severely tried. To the lesser degree of density of fresh water is due the breaking of the waves with a quicker, pounding motion, quite different in character from the larger and comparatively sluggish billows of the ocean.

The lake storms are often of terrific violence, and as there is no room to run before them as can be done at sea, a lake ship must bear the stress of it and fight it out. At such times a loaded freighter's waist will be awash with green water, the bow will be buried in the combs, while her whole frame will be twisting and groaning under the tremendous strain. Under such conditions there is always the imminent danger to shipping, of whatever class, of foundering in mid-lake, a form of disaster rarely occurring at sea, where the perils most encountered are those of a lee shore or collision in a fog. A freighter without a cargo to lend rigidity is in a situation graver still, and on one occasion the captain of a leviathan, after battling with a storm on Lake Huron, found upon reaching a harbor of refuge that the working of her plates had cut thousands of the steel rivets fastening the plates together, and several hundred pounds of the rivet-heads were taken from her hold. A few hours longer of the struggle with the lake furies would have sent the big ship

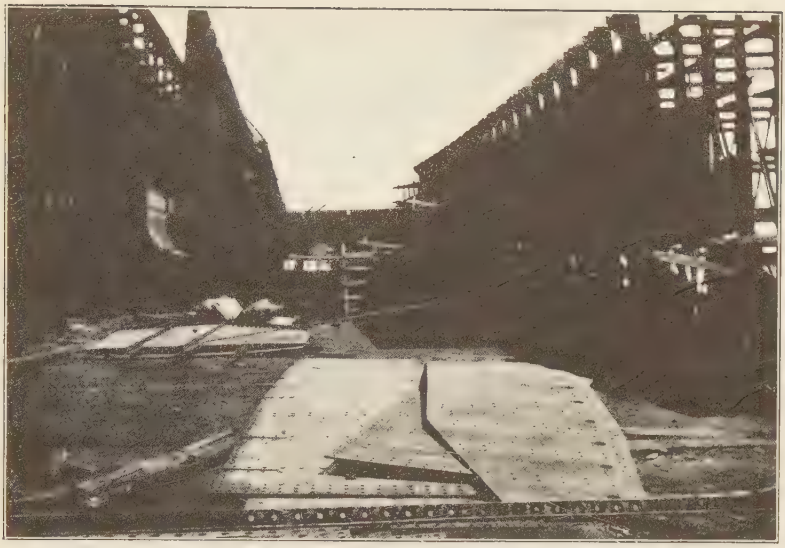
to the bottom. No form of construction has yet been devised which eliminates these dangers by a guaranty of strength to withstand the gales of the lakes. Only a few years ago a Clyde-built steamer, which had weathered many a fierce storm on the high seas, was so pounded about during a gale on Lake Erie that her seams opened and she went down with all on board. In December 1909, the big car transport the *Marquette and Bessemer No. 2*, with thirty cars of coal, and structural iron piled on top, turned over in the mountainous seas of Lake Erie, and went to the bottom with a loss of thirty-eight lives.

Profiting by the experience of the earlier builders of steel ships for the lakes' service, and by the behavior of the freighters in the five hundred foot class, the constructors have evolved a type of ore ship entirely lacking the defects of structural weakness inherent in vessels of such proportions, and still retaining the desirable qualities of stability and speed. The last requisite of a successful model has been secured with but a slight increase in horsepower over the four hundred foot class, and the six-hundred-footer requires but a few more hands to man her. With a rate of seventy cents a ton from Lake Superior to the Lake Erie ports, the temptation to build to the limit of structural stability is a reasonable one. Many vesselmen, however, believe that the limit has been reached, and that the six hundred and six foot leviathans on the Great Lakes will hold for many years the proud distinction of being the "largest coarse freighters in the world." This is a fair prophecy and will likely hold true, at least until the Government provides a clear channel of twenty-five feet through all the waterways of the Great Lakes.

The construction plans and specifications for these ships, showing every detail of the work, are of exceeding interest and are a revelation in present-day methods. They make clear the principal features of construction

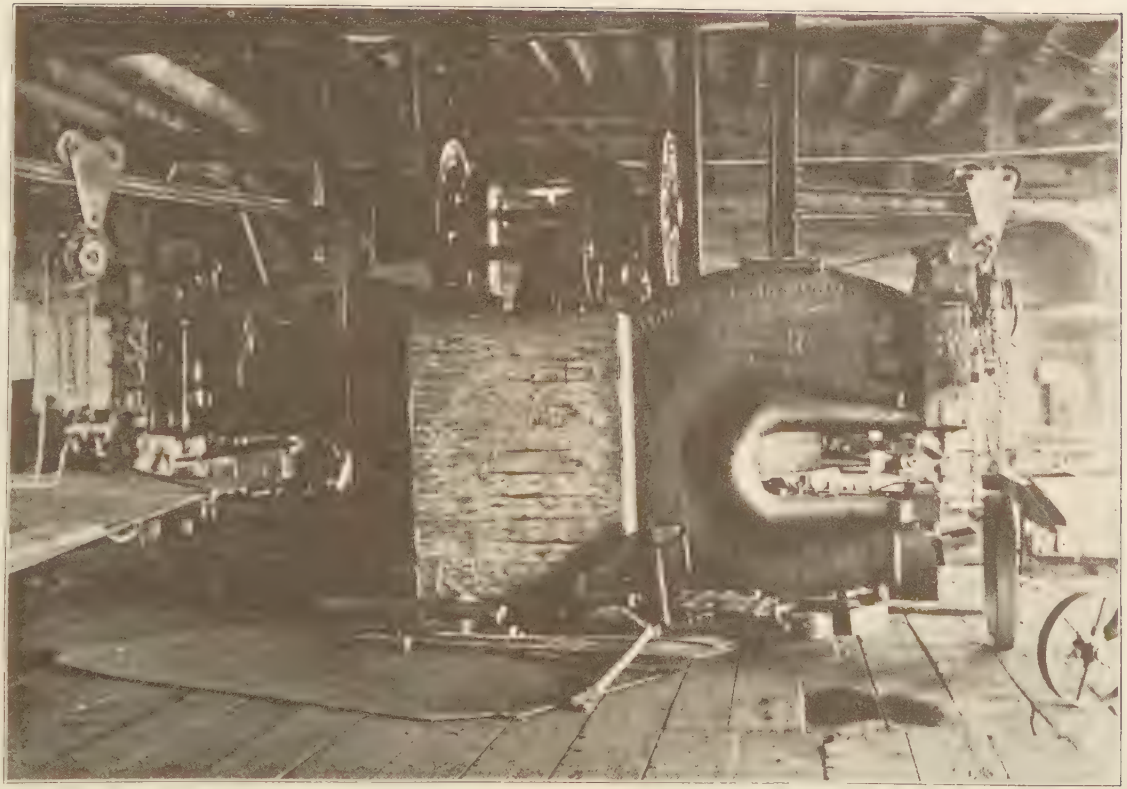
by which the maximum of structural strength is secured and with the sacrifice of but little cargo space. As a first consideration the keel is of unusual proportions. It is built of sheet steel forming a continuous plate girder five hundred and eighty feet long by six feet, three inches wide, thus forming between the outer and inner bottoms a space sufficiently high for a tall man to stand erect. This space is divided into numerous small compartments by the ribs which are riveted to the keel on both sides at intervals of a few feet. Certain groups of these rib girders are perforated with large holes to permit the passage of water to ballast the ship when running light. Other ribs at stated positions in the blue-prints are solid to form a bulkhead system of water-tight compartments, any one of which can be filled or emptied entirely independent of the others. Upon the top of this strong frame the steel inner bottom or cargo deck is laid. Throughout the midship section and extending forward and aft to within about one hundred feet of the bow and stern, the outer bottom is flat, and then rounds up rather bluntly. The upright frames are of the angle-bar construction and form a double wall or sides for the ship for about half their length, sloping easily to a point above at the beginning of the curve to the arches.

The third feature, providing added strength and rigidity to the ship, is the common use of the arched girder placed above and binding in their stiff grip the upper ends of the uprights, and also forming rigid supports for the main deck with the hatchways between them. The ribs, uprights, and arches are all constructed on the ground or in the moulding shop, and, as fast as they are completed, they are hoisted into place by the cantilever crane, the long arm of which reaches far out over the structure. The various parts are temporarily secured in place by bolts, but riveting gangs follow close after the erectors, and the constant *rap-a-tap-tap-tap* of the pneumatic riveters testifies to the progress of the work. The plates



Scene in construction of Steel Freighter *Daniel J. Morrell* about forty days after laying of first keel plate

The Hull of a Steel Freighter about sixty days after beginning of construction



View in Shop of Shipyard, showing the huge punch and shears

which sheathe the frame are made of five-eighth and three-fourth inch mild steel. After being cut and shaped to conform to the rounded form of the ship, the rivet holes are punched in exactly the right places to fit the holes previously bored in the ship's frame. They are carried from the shop to the steel skeleton out in the yard by locomotive cranes, hoisted into place, bolted, and riveted fast, in the same manner as the component parts of the frame are secured toegther.

In order to secure the maximum of cargo space the propelling machinery is placed in a separate water-tight compartment in the extreme stern of the ship, the bulkhead between the machinery and cargo holds being constructed with special regard to strength and rigidity. The boilers, engine, and much of the auxiliary machinery is here installed very compactly, allowing ample room for coal bunkers, and oil and supply chests. Besides the steam steering gears there are steam capstans, winches and hoists, pumps, and an electric lighting plant.

The engine is of the vertical, triple expansion, screw-propelling type, developing twenty-two hundred horse-power at one hundred and twenty revolutions per minute. The cylinders are twenty-four, thirty-nine, and sixty-five inches in diameter by forty-two inches stroke of pistons, and are supplied with steam at one hundred and eighty pounds' pressure from two Scotch boilers, fitted with Eaves and Ellis induced draft. The boilers are each fifteen feet in diameter by twelve feet long, weighing nearly one hundred tons, and are rated at four hundred and fifty boiler horse-power.

The wheelhouse, captain's and mates' cabins are located in the extreme bow, and are finished in mahogany and luxuriously furnished. The flagship of the fleet and generally two or three others are fitted out with an extra cabin and staterooms to accommodate the owners and friends, for a trip up the lakes on a freighter is quite the "thing" in midsummer. The crew is comfortably

housed in a large cabin on the quarter-deck. Telephones connect the wheelhouse, the captain's and owners' cabins and the engine room, fire holds, crew's quarters and galley; and every other device for convenience and comfort is provided on the lake giants of to-day.

If all goes well the machinery will be installed and the finishing touches completed in about thirty days after the launch, and the steamer sails away on a short trial trip. The machinery will be stiff, and some journals will run hot, but after a proper tuning up, the maiden trip is begun in about one hundred and forty days after the initial work was started — the laying of the keel. The entire cost of such a ship will be about five hundred and forty thousand dollars. One such freighter on her first trip from Escanaba to Chicago down Lake Michigan carried fifteen thousand and eighty-one net tons of iron ore on a draft of twenty feet, six inches, a record for the time.

The normal economic speed of these lake giants is between ten and twelve miles an hour on load draft. With no unusual delays from accident or loss of time in loading and discharging cargoes, the modern freighter will make thirty round trips between Duluth-Superior and the Lake Erie ports in a navigation season, transporting nearly four hundred thousand tons of ore. This performance, however, is contingent upon their returning to the upper lake light, in ballast, which is the practice of the ore carriers operated by the steel companies. Many of the independent lake lines send back their steamers laden with coal, and in this double service about twenty round trips are made in a season.

The Pittsburg Steamship Company, which is the holding and operating concern for the lake transportation interests of the United States Steel Corporation, owns and controls the largest single fleet flying the American flag upon any waters of the globe. Through consolida-

tion and by purchase, and also by additions of new steamships built from time to time, the fleet has grown until it now numbers one hundred and five vessels, of which seventy-eight are steamers and twenty-seven are barges and schooners. The aggregate registered tonnage exceeds four hundred thousand, and the combined cargo capacity of a single trip is fully three-quarters of a million tons. Every single unit of this great fleet is of steel and may register anywhere from two thousand to seventy-five hundred tons, which range in size is representative of the development in the merchant marine in the last twenty years.

The era of steel shipbuilding on the Inland Seas was inaugurated in the late eighties; and of the Pittsburg fleet the *Cambria,* of dimensions two hundred and ninety-four feet length by forty feet beam, and of nineteen hundred registered tonnage, is the pioneer, having been built in 1887. The following year the *Corona* and *Corsica,* three hundred and twelve feet in length by forty feet beam, and of twenty-four hundred tonnage; and in 1890–91, the *Briton, German, Roman,* and *Saxon,* of the same dimensions, were built. Six steamers of the whaleback type of ship, which was greatly exploited at that time, and of about the same size and tonnage, and two barges of twenty-two hundred tons were constructed in 1891–92, and also six smaller barges of thirteen hundred tons. The Colgate class of three steamers, three hundred and twenty feet in length by thirty-eight feet beam, but of only seventeen hundred tons' register, and four in the three hundred and fifty foot class, of twenty-two hundred to twenty-eight hundred tonnage, were built in 1892.

Until 1896 no more vessels of the present fleet were constructed; but in that year shipbuilding was revived along the entire chain of the lakes, and six whaleback barges of the Corliss class, measuring three hundred and sixty-eight feet in length by forty-four feet beam, and of thirty-two hundred tons, four steamers and three barges

of the Bell class, three hundred and eighty feet in length by forty-five feet beam, and registering thirty-four hundred tons, and two schooners, three hundred and ninety feet in length by forty-eight feet beam, were added. The four hundred foot class is represented by six vessels of forty-eight and fifty feet beam, and of four thousand tons; the four hundred and twenty-five foot class which appeared from 1896 to 1898 by no less than twelve fine steamers of forty-three hundred tons; and the four hundred and fifty foot class by as many first-class steamers and barges. This completes the list to 1898.

As the Government increases the depth of the navigable channels along the connecting highways of the Great Lakes, the vessel interests are quick to take advantage of the greater draft afforded, and build larger and deeper-hulled vessels to utilize every inch of water in the straits and harbors. In 1898 the steamer *Samuel F. B. Morse* was built in the Bay City shipyards of dimensions four hundred and seventy-five feet length by fifty feet beam, and of five thousand tons' register, and was considered a leviathan of the lake marine. Nine others of this class followed during the next two years, but the close of the century witnessed the advent of the five hundred foot class of five steamers, each of a carrying capacity of ten thousand tons. A lapse of five years followed in which no new ships were added to the fleet, but in 1905 four splendid steamers of the five hundred and sixty-nine foot class, and with a beam of fifty-six feet, and of twelve thousand tons' burden, were built. These may be called the *Frick* class. In 1906–7 six of the largest and strongest vessels of the six hundred foot *Morgan* class were added, thus increasing the already immense carrying capacity of the fleet by about fourteen per cent.

In the register of the Pittsburg fleet there appear some of the illustrious names of history, both in the discovery

and exploration of the Great Lakes region, and in the advance of the mechanical arts. Among the older steamers of the early steel class which were commissioned in 1890–1 there are the *Griffin,* the *Joliet,* and the *La Salle.* Coming a few years after there are the *Robert Fulton,* the *James Watt,* the *Lafayette,* the *John Ericsson,* the *Samuel F. B. Morse,* and the *General O. M. Poe.* To commemorate the names of others of a later generation, also famed in the sciences and engineering, there are vessels christened the *Bessemer,* the *Corliss,* the *Bunsen,* the *Eads,* the *Krupp,* the *McDougall,* the *Roebling,* and the *Siemens.* These vessels were all built prior to the present century. In this later day the personal aggrandizement of the captains of industry has dominated the choice of names for the vessels now built and building, and such names as *Corey, Garey, Frick, Gates, Perkins, Rogers, Widener,* and others, appear.

Ranking second in importance and in number of vessels and tonnage is the J. C. Gilchrist fleet, which is engaged in the general coarse freight trade. Comprising this fleet are thirty-four vessels of steel and thirty-five of wooden hulls. They are all steamers excepting five which are of the barge class, two being of steel. The earlier steamers of this fleet date from 1874, while the others in the wooden class were built in the eighties and nineties. They rank with the largest of the wooden ships afloat on the lakes, measuring from two hundred and fifty to three hundred feet length, and from thirty-six to forty-two feet beam, and are very economical carriers. Many of the steel steamers are of the four hundred and twenty-five, four hundred and fifty, and five hundred foot classes, and like the vessels of the steel trust, bear the names of well-known men in the commercial world. The total registered tonnage of the fleet is about two hundred thousand, and the carrying capacity is somewhat more than one-third of a million tons in a single trip. Included in this are the two fine

steamers of the five hundred and forty foot class, commissioned in 1907, each of eleven thousand tons' cargo capacity.

Mitchell and Company own and operate a fleet of nineteen steamers, of which all but three are of steel, of large carrying capacity, registering in the aggregate eighty thousand tons. Ten of these are of the four hundred and twenty-five foot class with fifty feet beam; one each in the four hundred and fifty and five hundred foot classes; and two in the five hundred and forty foot class with beam of fifty-five feet, built in 1906. The Tomlinson fleet consists of seventeen modern steamers of steel, registering seventy-six thousand, seven hundred tons. With one exception, the *City of Bangor,* these ships have been built since 1902 but, nevertheless, they illustrate in a forcible way the development of the lake marine in recent years. From the four steamers of the *Sultana* class of dimensions three hundred and seventy-five feet length by forty-eight and fifty feet beam, and the three of the four hundred and twenty-five foot class, the two of the five hundred foot class, and the four splendid steamers of the five hundred and twenty-four foot class with fifty-four feet beam, to the *Frank C. Ball,* five hundred and forty-nine feet in length by fifty-six feet beam, there is a wide transition in size, power, and construction.

The United States Transit Company is also a factor in the ever increasing commerce of the Inland Seas, and operates twelve modern freighters, registering fifty-one thousand, five hundred tons. They are all of steel; two of three hundred and sixty-five feet length by forty-eight feet beam, seven of the four hundred foot class, of forty-eight and fifty feet beam, two of the four hundred and twenty-five foot class, and one of the five hundred and forty foot class, beam fifty-five feet, built in 1905. The Hawgood fleet registers forty-eight thousand, seven hundred tons and has a total carrying capacity of nearly seventy-five thousand tons in a single trip. Of the eleven

steamers, nine are of steel in the four hundred foot, four hundred and twenty-five foot, and four hundred and fifty foot classes, while two may be included in the five hundred and forty foot class.

In the ore trade are the twelve vessels of the Cleveland-Cliffs Company, registering thirty-seven thousand tons, no two of which can be placed in the same class. The steamers range in size from eleven hundred tons to the modern leviathan, the *Wm. G. Mather,* of dimensions five hundred and forty feet by sixty feet beam, of eleven thousand tons' capacity. The latter steamer is one of the few (four or five) on the lakes with a beam of sixty feet; and the others are of the six hundred foot class. The Hutchinson freighters, seven in number, register about thirty thousand tons, three of which are in the five hundred foot or over classes, one being five hundred and forty feet length by fifty-five feet beam, and was commissioned in 1905. The Wilson Transit Company operates seven steamers of steel with an aggregate tonnage of twenty-eight thousand, eight hundred, one of which may be classed with the five-hundred-and-forty footers.

Pickands, Mather and Company, in naming their eleven vessels, adopted historic names. There are the *Appomattox, Constitution, Kearsarge, Santiago,* and *Victoria,* while the largest of the fleet, in the five hundred and forty foot class, reverted in its christening to the personal name, *Amasa Stone.* The fleet of James Corrigan, eleven ships in all of various sizes of steamers and barges, registers twenty-three thousand tons, and comprises three vessels of the four hundred foot class, the others being of wood and of much less capacity. The Provident Steamship Company operates three large freighters, aggregating fifteen thousand tons, built in 1902–3. Other smaller lines owning giant ore carriers are: Jones and Laughlin, two, five hundred and forty-nine feet long by fifty-six feet beam; the L. C. Smith Transit

Company, one, five hundred and sixty-nine feet long by fifty-six feet beam; and the Cambria Steel Company, two, six hundred feet long by fifty-eight feet beam. Several large vessels have been built under the bonding plan and are operated independently.

CHAPTER XXIII

FOR THE FREEDOM OF THE SEA

Fulton's Favorite Motto — The Lakes are "Inland Seas," Supreme Court Decision — Government Works Planned for Channels Twenty-five Feet in Depth — The Lighthouse Service — Equipments of Fog Signals, Buoys, Spar Markers, Gas Buoys — The Life-saving Service — Stations, Equipment, Duties — The Beach Patrol — Coston Light — Life-boats in Surf — Power Boats — Breeches Buoy — The Dalton Improved Buoy — Thrilling Rescues and Disasters.

WHEN Robert Fulton gave expression to his imaginative zeal in the phrase, "The liberty of the seas will be the happiness of the earth," he voiced a sentiment of singular potency for posterity. For he said, "Liberty on the seas is that which has been long and anxiously desired by every good man, to secure to America, that liberty of commerce, tranquillity, and independence, which will enable her citizens to apply their mental and corporeal faculties to useful and humane pursuits, to the improvement of our country and the happiness of the whole people." This insight of the prophetic nature of the famous engineer, in the light of the century's achievement in marine architecture and naval armament, is very impressive and reveals a profound mind. His favorite sentiment fairly tingles with the spirit of optimism, and although given more than a hundred years ago, has lost none of its stirring appeal to the patriotism of to-day.

With all his breadth of vision, Fulton could hardly have included the great inland lakes in the category of seas, for, at the time when inland navigation was given impetus by the early steamboats, nearly all the region

was a vast wilderness. The depths of the forest and the by-paths of the savages were yet untrod by white men. The fresh-water breezes and the quick, choppy seas raised by them, and the scenes along the lake shores, were almost unknown to the people of New England and other Atlantic States. But Fulton was deeply interested in the development of inland water commerce, and his plans for a great canal system, including the "Grand Erie," to tap the western country, were marvels of the age.

Ever since the *Clermont,* by her regular trips on the Hudson River, proved the practicability of steam propulsion of vessels, the tendency in shipbuilding has been toward larger and deeper hulls with a consequently increased carrying capacity. This was one of the factors in the evolution of the slow and uncertain sailing vessel to the steamer; but to float the larger vessels, deeper and broader channels in the connecting straits between the lakes and in the numerous harbors, were soon found to be necessary. So urgent was the need for an improvement of the waterways that the issue finally became one of national importance. But the Government was slow to act in the matter, — to commit itself to a policy of internal improvement, which might involve it in an expenditure of millions of dollars for a doubtful benefit to any one.

It was not until 1871 that the Supreme Court of the United States declared all the upper lakes, including Lake Erie, to be seas, commercially and legally. Congress under this decision is empowered to improve the harbors of the lakes and the channels of the connecting waterways, precisely as it has power to do the same on the seaboard. This has led to a vigorous policy in making provision for the increase of the lake tonnage, the encouragement in building larger vessels, and for the safety of commerce and the protection of life.

Throughout the entire chain of Great Lakes the Government engineering corps and dredging contractors are busily engaged in removing the obstructions Nature has

placed as a handicap to the free navigation of channels and harbors. In some places these works are of great magnitude, as at the Limekiln Crossing in the lower Detroit River, the new Livingstone Channel through the western delta of this river, and the new canal and locks at Sault Ste. Marie. All improvements of a permanent nature are directed toward an ultimate depth of twenty-five feet in harbor and rivers from the head of Lake Superior to the foot of Lake Erie, and including the larger ports of Lake Michigan. Upon the opening of navigation in 1910 the maximum depth through the watercourses, rock cuts, canals, and locks was twenty-one feet, and the aim of the Government engineers and contractors is to effect a deepening of one foot a year until the entire work is completed. This, it is believed, will meet the demands of the Great Lakes marine for some years to come.

For the safety of inland navigation and the protection of life, lighthouses and lightships mark every rocky and dangerous coast, every treacherous reef and shoal, while countless spar and gas buoys, bell and whistling buoys, and other beacons, guide or warn the lake mariners through the channels of river and harbor. Life-saving stations as fully equipped and as efficient in force as any on the seaboard, are placed at dangerous points along the lake shores where disaster through storm or a rocky coast is imminent. There are harbors of refuge and the beach patrol; there are the Government weather reports and warnings of approaching gales, and the inspection bureaus; and there are fire boats and powerful wreckers to protect and save, or recover vessel property. And, besides these safeguards there is the Government survey and engineering corps, which sounds the shallow waters and sweeps the lakes' beds, and thus recharts the treacherous channels, marks the shifting sands of shoals, sunken wrecks, or hidden obstructions to free navigation,

Thus to-day, with every appliance that the genius of man can devise and a liberal Government can provide for

safety, with the wide expanse of fresh water and the canals of both nations open and free to the world, and with the greatest waterborne commerce of any inland lakes, the expression, "The liberty of the seas will be the happiness of the earth" as applicable to the "Gitche-ga-me," the "big sea water," is most appropriate and impressive.

The lighthouse establishment on the great Inland Seas is a function of the United States Lighthouse Board, the scope of which is greater than that of any similar body in the world. The entire chain of lakes is divided into three districts, and, of nearly two thousand aids to navigation which are maintained from April to December, more than six hundred are lights. These may be classified as fixed, those which are mounted on high stone shafts, on cribs or posts and which number about four hundred and sixty-five, and floating, which comprise twelve lightships and one hundred and twenty-four gas-lighted buoys. In addition to these there are one hundred and fourteen bell or whistling fog signals connected with the light stations, and numerous daymarkers, such as spar and can buoys on station.

All these safeguards, of one kind or another, are placed wherever there is the least danger of disaster overtaking the lake craft, the distribution being made with regard to the nature of the obstruction. In places where lighthouses cannot be built to withstand the gales or ice-jams, which are prevalent for several months of the year, lightships of peculiar construction but of great strength, and securely anchored on the reef or shoal, carry the warning beacon. The numerous gas buoys, bell and whistling buoys fill in the gaps between the more dangerous points, and in rivers and harbors, while the spar and pile markers of narrow channels serve a like purpose by day. So thick are the lights along the highways of the lakes, that coasting vessels are seldom beyond the range of one beacon before another comes in sight. Their lights overlap, and

Light at entrance to Ship Canal, Lake St. Clair

Steamer passing the Lighthouse

On the St. Clair River

St. Clair Flats

in some places are so thickly clustered that there are no dark spots in which a ship may be lost. Upon any of the three upper lakes a vessel may steam at fair speed for a day and a night far beyond the sight of land, and yet be as safe as on the broad expanse of the ocean. Every hidden reef and shoaling waters has its gleaming shaft of light penetrating the blackness of night for twenty miles in clear weather. The approach to a sandy cape or rocky coast is likewise made known to the mariner, while, in the twisting turns of river and harbor channels, the range lights guide and direct the pilots to a safe port.

In striking contrast to the present-day institution were the meagre means — the almost pathetic efforts of a century or more ago to light the mariner on his way. Then any kind of rude structure on a headland or barren crag bearing its pitch and oakum fires, or even wood bonfires on a sandy beach, flickering a fitful light over the water for a distance of a mile or more, were about the only warning signals. There were no stakes to mark the winding channels or shifting shoals and few landmarks to show the safe way; and besides, the crude charts then in use were inadequate and unreliable. Navigation at night excepting in the open lake was attended with such dangers as to be almost impossible, and cautious mariners usually anchored in some bay or cove until dawn. To-day there are great towers of steel or masonry and concrete, solid and integral with the ledges, and lighted by oil lamps of great range showing a fixed white eye, a flashing light of white or red, or a fixed red.

The wonderful lenticular apparatus of the revolving type is as reliable as human ingenuity can devise. It consists of a large cage, in which a man can stand erect and have three feet of space to spare, with an arrangement of prisms and lenses so that all the light from the lamp within is collected and sent out in one direction over the sea and parallel to it. Scarcely any light is lost up or down as it is collected, reflected, and refracted where it

will do the most good. If a lighthouse is on the coast none of the precious rays is lost to the land side; they are all united in the one brilliant beam seaward. Electricity has not supplanted the oil lamp because of the difficulty in keeping the light in the centre of the focal point of the lens cages, the carbons burning unevenly or the feeding mechanism failing. The slightest disarrangement of the light causes the beam to be directed upward or perhaps downward and the distance it carries greatly reduced. The oil lamp is far steadier, gives a volume of light at which it is impossible to look, and moreover, is thoroughly reliable. The wicks used are circular and in first-order lights are six in number, placed one inside another, and the flame produces great heat. Under certain conditions a new glass chimney must be put on about every fifteen minutes, before the old one melts and runs away. Oil vapor lamps and acetylene gas, of both high pressure and the local generator systems, have been used as illuminants with very favorable results, the chief advantage of the former being in a remarkable saving in oil; the gas, however, showing but slight economy in cost of operation over the old oil burner, and requiring almost constant watching. That the lights never "go out" even by accident, is due very largely to the watchful fidelity of the keepers. The cage is operated by a somewhat complicated mechanism beneath the standard upon which it rests.

These great lighthouses, many of which are monuments to the triumph of monolithic building, were erected only by the boldest engineering feats, the expenditure of much money, and even the sacrifice of life. As an instance of this the Spectacle Reef presented engineering problems, the solution of which was almost breathlessly watched by the ablest engineers of the world. This hidden rock lies in the northern part of Lake Huron, not far from the entrance to the Straits of Mackinac, and, being ten miles directly east from the nearest land, Bois Blanc Island, it is in the direct course of vessels bound through

the straits, and near the course to the St. Mary's River and Lake Superior. Because of its pitifully unprotected position with a sweep of one hundred and seventy miles of open sea, it was not believed that any mass of stone that man might raise would withstand the fury of the Winter gales and the terrible push of grinding, crunching ice.

But the engineer who planned it well knew the dangers and difficulties; the ice and waves were guarded against and he built with a cunning hand. He laid the masonry courses one on the other and fitted them so closely and dove-tailed each to each, and finally bolted all together so strongly and securely, that a minimum calculation determined the mass to be even stronger than a shaft of solid stone. By causing the ice to be broken on an outer stone structure, it grounds in seven feet of water which covers the reef, and thus protects the shaft from the force of the ice fields. This great triumph of engineering skill was completed in 1873, and General O. M. Poe, who was chief engineer to General Sherman in his march to the sea, and whose works throughout the lake region will, for generations, bear witness to his ability, was its designer and builder.

When the keepers returned to the lighthouse in the Spring of 1874 they found a mass of ice forty feet high piled around it, and had to cut their way with axes through ten feet of it to reach the door of the structure. Spectacle Reef Light still stands and its piercing beam of light, visible for more than twenty miles in every direction, saves hundreds of lives and millions of dollars' worth of property every year. Stanard's Rock Light in Lake Superior, near the course between Marquette and Keweenaw Point, and thirty miles distant, is another well known beacon of great protection to mariners. Racine Reef on the western coast of Lake Michigan is one of the danger points of that troublous body of water.

Scarcely less spectacular, and of almost equal value to

the lake mariner, are the stanch lightships rolling and tossing in the fresh-water swells. They supplement the lighthouses, but are few in number as they are placed only in much-travelled waters where by reason of shifting sands or uncertain ledge, a shaft of stone cannot be built. Bar Point Lightship at the mouth of the Detroit River is probably the best known to travellers between the East and Middle West by the water route. It marks the treacherous shoals of these shallow waters, and is one of fifty fixed or floating gas buoys within a distance of about twelve miles. Point Pelee Lightship, off that dangerous projecting cape, is also a prominent beacon of the Lake Erie waters.

Whistling and bell buoys, those mournful sentinels of the sea which mark dangerous places to be avoided in fogs or mists, together with fog horns, Daboll trumpets, and steam sirens, are other important adjuncts of the lighthouse service.

To maintain all these aids to a free navigation of the lakes, — to keep them painted and in repair, and to supply light stations with rations, coal, oil, and apparatus, — three steam tenders with full crews of machinists and other artisans are kept in service for nine months of the year. The work of replacing the big iron buoys with a heavy sea running is a ticklish job, for to lower the new one over the side of the tender, and to hoist the other, which is nothing less than a huge iron pendulum, and to drop it safely on the deck is a matter of good judgment and strong nerves. To make a landing at the isolated lights out in the open lake during a storm, no matter how pressing the need may be, is impossible, and the little tender must wait in a convenient harbor for the weather to abate. Five other tenders are in service for the inspectors of the lighthouse districts.

Although the lighthouse service by its highly efficient force robs the rocky coasts and yawning breakers of many victims, it cannot prevent every impending disaster to

the lake marine. Its purpose and aim is to guide and warn and beyond that it cannot go. From the very nature of the sea and the perils of navigation, many a stout ship has been lost by disablement or disarrangement of its mechanical being. A steering gear may go wrong at a critical moment, a shaft may snap, or a steam pipe fracture, throwing the vessel into the trough of the sea and the mercy of the waves. Or the seams of a rotting hull may open, the plate rivets of a steel ship may shear, giving rise to frightful leaks which, beyond the capacity of the pumps or the efforts of the crew to save, cause the vessel to founder or to be driven on an inviting shore. In such catastrophes imperilling life and treasure, and in shipwreck, which are quite without the scope and power of the light-keepers and their men, another Government service comes in as a saving grace.

The United States life-saving service on the lakes comprises fifty-nine stations fully equipped for any emergency and with a complement of about five hundred and sixteen men. It is of comparatively recent founding, the first rescue of a shipwrecked crew by an organized band of paid heroes having been effected only a little more than thirty years ago. The development of the service to its present footing has been largely due to the public interest and demand for more effective means of succoring the distressed mariners, an interest which is always whetted by a disaster attended with loss of life. The more or less liberal appropriations of Congress from time to time, and the creation and guidance of the institution by Sumner I. Kimball, its first and present general superintendent, have produced the most efficient life-saving service in the world. It is to-day the product of many men's minds and the courage of many stout hearts, the surfmen behind the oars and the breeches-buoy, and the patrol.

The life-saving stations on the lakes are for the most part located within or near the harbors of the principal ports, or on dangerous capes and shores which form the

natural graveyards of the old-time marine. In some places the stations are only a few miles apart, in others a longer stretch of a day's walk along the hard-packed sands separates them, and in still others forty to one hundred miles may intervene.

Coming up the lakes from the head of the St. Lawrence River, one will find four stations along the southern shore of Lake Ontario, six on Lake Erie, ten along the western shore of Lake Huron, and eight on the storm-tossed shores of Lake Superior. Lake Michigan, which is the only one of the five fresh-water lakes wholly within the boundary of the United States with its long coast line of quite eight hundred miles, and whose waters are of tempestuous character, requires no less than thirty-one stations to provide adequate protection to life. The State of Michigan faces on four of the Great Lakes, and its shore line, which is much longer than that of the other seven States combined, is protected by thirty-four stations. Only two other States face on more than one of the lakes, namely: New York on Lake Ontario and Lake Erie, and Wisconsin on Lake Superior and Lake Michigan, the former having five stations, and the other nine. Ohio has four stations, Illinois four, and Pennsylvania, Indiana, and Minnesota one each.

The station buildings, which are located near the beach in favorable places for a quick get-away to a wreck, are plain but substantial structures; and the quarters of the crew are comfortable and often homelike. There is not lacking here and there a touch of the feminine, for, although this quality is entirely foreign to the rough and hardy but big-hearted surfmen, there is the family life of the little settlement of white and green cottages back among the trees of the upper beach. In locations where the soil is something better than sandy wastes, kitchen gardens, planted and cultivated by the men in hours of leisure, go far toward supplying the larders in Summer and Winter. Out of the meagre pay of sixty-five dollars

a month, for but eight months of the year, the surfmen must provide their living, and there is no provision for disablement or pension. The keepers of the stations are paid nine hundred dollars a year for twelve months' service.

The life of the surfman is not one of ease and enjoyment of a quiet and domestic existence, as may appear to the casual view of the visitor to the station, but, on the contrary, it is one of strenuous duty and hardship and is very likely to be monotonous and colorless. The daily routine provides for practice drill and exercise in the various methods employed in rendering aid to the shipwrecked, for keeping the buildings and apparatus in repair, and the grounds in perfect order. And a constant watch for distress signals is maintained from the observatory on top of the station. It is at night that their duties become severe and very often perilous. During that time, which is divided into three watches, they patrol the beach for miles in both directions, and keep a vigilant lookout for signs of wreck, such as a hatch grating, a blind, a bucket, or some other light article washed ashore. Or it may be the glimmer of a light, or a faint flare of a distant rocket that tells them of disaster.

In such an emergency the Coston light, which is always carried by the surfman, is set off. It is a piece of fireworks which, ignited by a sharp blow on the end of the handle, produces an inextinguishable flare of dozens of roman candles in one concentrated display. This signal continues for nearly ten minutes, the illumination is seen for miles, and serves the double purpose of telling the shipwrecked that succor is at hand, and of warning a passenger steamer or freighter of a near approach to the dangerous shore. With only the rays of his lantern and the roaring surf as guides, the surfman races back to the station to set the machinery of rescue in motion. If his fellows have seen the flaring signal they are waiting eagerly and impatiently for his report of the exact location and con-

ditions of the sea running, and are ready with any apparatus which is demanded for a rush to the scene. In any event they are on their feet instantly, keen and anxious, with the spirit of rescue — the dominant trait of the life-savers from the sea.

The equipment of the stations embraces every appliance which the genius of man has produced for the saving of the shipwrecked, and it is always ready for any emergency. If the wreck is in shoal water with but a moderate sea running, the surf boat, which is perhaps the most important article of the outfit, is run out on its carriage and hauled by main force through the soft, yielding sands. Upon arrival at a point opposite the wreck, the boat is launched through the surf and the struggle toward the doomed vessel is begun. If all goes well it is reached and the women and children taken off; and upon grounding in shallow water, they are carried, or, if the surf is too strong, they are dragged, to dry land. The sailors on the wreck are then brought ashore in the same way, and, if the location is isolated, the unfortunates are hurried to the station where dry clothing and nourishing food is furnished them.

In the event of a high sea running, in which the light surf-boat would be as cork in a tempest, the self-righting and self-bailing lifeboat is used instead. This boat is thirty-four feet in length with a heavy gun-metal keel and large air tanks, which cause it to right at once upon capsizing, and to bail itself by an ingenious arrangement of valves. It is fitted with a twenty horse-power gasoline engine and two short masts with jury sails. The latter power may be struck and quickly stowed when not needed. Having ample power the boat is generally launched at the station and covers the distance to the wreck, even though it be of several miles, in a short time. The chief advantage in the use of the power boat, aside from the saving of time in getting to a wreck, is in having the life-savers fresh and strong for whatever of exhausting

labor may be demanded of them when the vessel's side is reached. Their strength is not sapped, as formerly, before the real object of their efforts is attained.

When the fierce Winter gales sweep the lakes and lash their troubled waters into the quick, choppy seas peculiar to them, no small boat can live an instant in the raging surf, and even the stanch and usually safe boats of the life-savers are useless. It is then that the famous breeches-buoy comes into use, or, if a large number of shipwrecked persons are to be landed and the time is short before the vessel goes to pieces, the life-car serves the same purpose. The breeches-buoy is not a new appliance, as it was first used a hundred years ago, but improvements have been made at times so that now, with its electrical attachments, it is more than ever indispensable to the life-saving service. By the latter means alone the efficiency of the buoy has been increased fully one hundred per cent, and the new buoys are now in general use at the lake stations.

The breeches-buoy is mounted on a carriage and, like the surf-boat, is hauled by manual strength to the scene of the wreck. It is somewhat lighter than the boat outfit, but is, nevertheless, a hard pull, the dead weight to each man being about one hundred and eighty pounds, and the pathway of the beach being fine, drifting sand. The apparatus consists of a long, stout hawser on a reel, a block with the buoy and breeches to run along the hawser, a whip line to haul it back and forth, and a Lyle gun or mortar for firing the shot line out and over the wreck. There are also a tail-block, two tally boards which give directions as to use by the sailors, and tools for making a secure anchorage on the beach for the end of the hawser.

When exactly opposite the wreck the crew goes into action and so perfect is the system and so thorough the training that there is no confusion and no orders of more than direction are given. Every man of the crew has a number and a position entailing specific duties for this

occasion as well as all others. These duties he learns to perform with skill and accuracy and he does them expeditiously. The outfit is laid out quickly on the beach, each article having a definite place, and the operations go on like clockwork. The firing of the mortar with its shot carrying a line to the wreck is spectacular, and if it has been well aimed with due allowance for the wind deflection, it passes over the wreck and the line settles in the rigging. This is eagerly secured by the sailors who at once haul in the whip (an endless line) attached to the other end. Attached to the whip is the tail-block and tally board with further instructions. Hauling in the whip brings one end of the hawser which is secured to a mast as far up as possible, and with the tail-block made fast about three feet below it, all is ready for the buoy.

The improved breeches-buoy with its electrical attachments is the invention of John W. Dalton, who has so perfected the device that, with the hawser once made fast to a wreck, every person on board can be saved. The buoy itself is much safer than the old model, it is easier for the shipwrecked to adjust themselves, and is more comfortable. Instead of four ropes, which support the rubber cushion, joining at a point just beneath the block, their ends are fastened to the corners of a square, steel spreader, and this in turn is secured to the ring of the block. The advantage of this arrangement is in providing a space well above the head of the passenger for the storage battery and the lights, which makes the operation of the buoy from the shore much more positive and rapid.

The shore end of the hawser, first having been drawn taut and made fast to the sand anchor, is further tightened by raising it about twelve feet above the beach by means of a wooden crotch, which constitutes a temporary pier, while the wreck itself serves as the other. Everything being now ready the men haul in the reverse end of the whip line, which operation causes the buoy to be drawn

to the wreck. It shows a green light seaward and a white light toward the shore, while another light, a white one, illuminates the cushion and the breeches, thus enabling the shipwrecked persons to get in quickly and adjust themselves as comfortably as possible. When the buoy is occupied the white light toward the shore automatically turns to a bright red, and a rocket is discharged, which is the signal to the shore for the rescuers to haul away. An air cushion, placed just above the passenger's head, prevents him from being injured by the traveller block banging about while being dragged through the surf. It also prevents a like injury to the passenger upon entering the buoy by the jerking motion of the vessel, lurching back and forth in the heavy sea.

Before the improved breeches-buoy came into general use it was impossible for the crew on shore to know definitely the location of the buoy, or when the occupant was ready to be hauled away, in case it reached the doomed vessel at all. Much valuable time was thus lost in needless hauling of the buoy back and forth in order to have it finally reach the wreck, and, if the lines became tangled, no one could tell where the trouble lay. With the new buoy, no matter how far away the wreck may be or how dark the night, the exact location of the buoy is known at all times, and the signals automatically given are positive and unmistakable. Dalton, who conceived the idea while witnessing a shipwreck on Cape Cod, in which all the crew were lost, spent the better part of two years in perfecting the buoy and bringing it to its present efficiency. It was adopted by the Board of Examiners of Life-Saving Appliances, appointed by the Secretary of the Treasury, upon its first demonstration in 1906, and its use has been rapidly extended throughout the world.

In cases where a large number of shipwrecked persons must be taken ashore, or women and children to whom the buoy is hardly suitable, the life-car is used. It is a covered boat which is attached to the traveller block and

hauled back and forth between the wreck and the shore in the same way as is the buoy. Being water-tight, aged people and invalids have been landed through the heavy surf, entirely dry and without serious discomfort. Silks, fine fabrics, jewelry, other valuable goods, and even gold bullion belonging to the Government, together with the mails, have been taken ashore in the life-car.

The minor equipment of the surfmen consists of life-belts, which keep them afloat when capsized in the foaming surf; life-suits, which afford a complete protection against icy waters and the cold of Winter; and the heavy oil-skins, rubber boots, mitts, and caps. Their training is not confined to the rescue work, for at times in the exigencies of shipwreck, persons reach the shore senseless and half-drowned. It is then that the surfmen resort to the usual methods of resuscitation, of ejecting water from the body and restoring respiration. The successful outcome of their efforts largely depends upon their knowledge of such work and intelligent application of it, the carrying of the unfortunate to the station, and subsequent care and attention while in the improvised marine hospital.

The number of casualties along the lake coasts, in which the life-savers render timely aid, varies but little from year to year, one season's rescues being fairly representative of any other. In a recent year the opportunities offered for life-saving numbered three hundred and ninety, of which the Harbor Beach station, on Lake Huron, had thirteen, the Holland station, on Lake Michigan, twelve, the Frankfort station, on the same coast, ten, the other stations ranging from nine to two. Nine lives were lost of the eighteen hundred and eighty-three persons on board the doomed vessels at the time of these rescues; and eighty-six of the unfortunates were cared for at the stations until they recovered sufficiently from the effects of their harrowing experiences, to go to their homes. The total value of the property involved was four million, two hundred and seventy-six thousand, two

hundred and eighty-five dollars, and the property loss was only two hundred and forty-seven thousand and thirty-five dollars.

The annals of the Government service are replete with thrilling accounts of sensational and heroic rescues, a work which cannot be recompensed by any wage the men may receive. The wreck of the steamer *Argo,* in the Fall of 1906, made necessary the rescue of twenty-two persons, which was effected with the breeches-buoy. The rescue of the crew of the schooner *Abbie,* off the harbor of Manistee, was a hazardous undertaking. Both masts had been carried away, the wreckage lying alongside, and the men were clinging to the cabin hatch, — the only part of the vessel above water. The frightful sea running and dashing over the wreck added to the danger, but, after repeated attempts, the crew was taken off and landed in the power boat at the lighthouse, the life-saving station being located nine miles down the coast. The rescue of a party of merrymakers in a launch which had been run down by a large steamer; the boarding of a water-logged schooner and repairing its pumps to aid the crew in pumping out the hull; the throwing overboard of a portion of another schooner's cargo, in order to lighten her to effect her release from a sandbar; and the reporting of missing tows, are some of the manifold services rendered by these valiant guardians of the coasts.

The United States inspection of the lake marine, especially of steam vessels, is another service of government function in the fulfilment of the policy for the safety of inland navigation and the protection to life. As many as fifty thousand life-jackets, or life-preservers, are examined and subjected to severe tests, every year. The material, stitching, weight, and the straps to secure them about one's body, come in for the closest scrutiny. Nothing is overlooked; if up to requirements each one is stamped by the inspector and the date likewise recorded on it; if it is found wanting in any respect it is thrown

out and cannot be used. If the good ones were laid down side by side they would reach for over forty miles. Fire hose is another article of safety equipment and, if coupled up in a continuous line, would measure nearly five and one-half miles. The engines and boilers of all steamers are subject to overhauling by the rigid inspection of the government officials, for no defect is passed. Every part of its mechanical equipment must be up to the required standard, if the vessel is to be commissioned for another season's run.

It is all these safeguards surrounding the lake marine and the protections to life afforded, which make for the "freedom of the seas." Without them it would hardly be possible for the vast fleet of express steamers to carry sixteen million passengers in nine months without the loss of a single life. It may truthfully be said that no travel in America during the first decade of the twentieth century has been so safe and free of casualty as that along the great highway of the Inland Seas.

CHAPTER XXIV

WRECKING AND FIRE TUGS, THE NAVY TRAINING SHIPS, AND THE MAIL BOAT

Dangers and Difficulties of Wrecking Ships — The New Wrecker *Favorite* — Methods of Raising and Salvage of Wrecks — Fortunes thus Made — Wrecking Concerns on Lakes — The Fire Tugs — Saviours of the Water Fronts of Lake Cities — The Latest Boat, the *Graeme Stewart* — List of Fire Tugs on Lakes — The Object and Scope of Naval Militia — Its History — Vessels Composing Fleet — The Little White Mail Boat on Detroit River, the only One in the Department — Its Work and Service to Thousands of Mariners and Vessel Owners.

EVEN before the life-savers have completed their work of rescue and are caring for the unfortunates, other agencies for the recovery of treasure — the ship itself and the cargo — are hurrying with all speed to the scene of the wreck. They are the salvors with stanch vessels and powerful machinery, summoned by wireless or by the telephone with which all stations are equipped; and almost as soon as the gale or fog, which may have caused the disaster, has abated or lifted, these wreckers are on hand ready for the laborious work. From a monetary standpoint the salvage of stranded or disabled vessels and the recovery of their cargoes is an important business, the saving of property in 1907 by the several wrecking companies on the lakes amounting to $4,029,250, of which $3,315,160 was the value of the vessels, and $961,125 that of the cargoes involved, while the loss sustained was only $247,035.

The engineering problems incident to the wrecking of ships require more splendid daring, more instant decision, and more resourceful ingenuity than any other service

upon the high seas. It is daring in sending divers down into battered hulls to locate and patch the frightful wounds, or in creeping among jagged rocks, along the soft, slimy mud, or clinging quicksands of the sea's bottom, to delve into the mysteries to be found there. It requires quick decision as to wrecking methods, for, should there be any delay in beginning operations after the survey of the ship has been made, another storm may break her up on the shifting sands, or she may slip off the rocks into deep water and prove a total loss. And then, as the work proceeds, the ingenuity of the salvage engineer is constantly taxed to provide ways and means to bring about the floating of the vessel. The successful outcome of the work is, after all, very dependent upon the condition of the weather, which is governed largely by the seasons. As nearly all salvage contracts are drawn up on the basis of "no cure, no pay" the operations are much of the nature of a gamble, and the engineer may find himself after much hard work facing a tremendous loss, or reaping a fortune as the reward of his skill and determination. Each wreck presents a separate and distinct problem and he must quickly classify his task and bring into use the special appliances adapted to the method employed.

The necessary equipment for the salvors is complicated and costly. It comprises as motley a group of vessels of different types as can be found in any waters. First of all there are the large sea-going tugs, grim and powerful, and able to plough through any sea and to stand up under the enormous weight of a sodden and partly floated hull to which they may be cabled. They are of great steaming power, with engines capable of sustained towing, pumping, and lifting, and, with a carefully selected crew of divers and expert wreckers. A vessel must be an absolute structural wreck which is not saved intact, and, after repairs, again rendered seaworthy. With the wrecking tugs there are the spacious floats fitted with cranes of

Locking down, Poe Lock, St. Mary's River

Detail of Lock Gates, Weitzel Lock, St. Mary's River

Steam Barge entering Weitzel Lock, St. Mary's River Canal

The *Greyhound*

great lifting power, lighters to take off the vessel's cargo when it is necessary to remove it, and barges carrying timbers, lumber and other working material.

The largest and most thoroughly equipped wrecker on the Great Lakes, or in fact upon any American waters, is the steamer *Favorite* of the Great Lakes Towing Company's fleet. She measures one hundred and ninety-five feet in length, forty-three feet beam, and nineteen and one-half feet depth, and, in addition to a bunker capacity of two hundred and seventy-five tons of coal, has a water ballast of six hundred tons. The steamer was completed early in 1907 by the Buffalo Drydock Company, at a cost of one hundred and fifty thousand dollars. That she is practically unsinkable, even with the dead weight of massive and heavy machinery and appliances, is assured by the four water-tight bulkheads of steel which divide the hull into five compartments; and there is also an air line encircling the ship with connections at each deadlight. The propelling engines are of twenty-five hundred horsepower, and are supplied with steam at one hundred and eighty pounds pressure by two Scotch boilers, each fifteen feet in diameter by eleven and one-half feet long. The most noticeable feature of the vessel is the huge "A" frame or derrick with its long steel boom and fitted with heavy blocks and wire cables, placed just forward of the twin smoke stacks. Below the "A" frame is the platform with many levers and controlling devices for the operator of the huge crane and other machinery. This is entirely open, giving an unobstructed view at any angle, but unprotected from the weather. As much of the work for the wrecker comes in the Fall and Winter months, the comfort of the engineers is provided by canvas stretched around the platform, while under their feet are warm steam coils.

But the real mysteries of the vessel lie below the main deck in its steel structure, for there are to be found every machine, every appliance, and every tool devised by man for the wrecking of ships; and they are of the latest and

most powerful type known to the mechanical world. The vessel is veritably a great floating machine shop and forge with all the sights and sounds and smells of the steel ship yard. There is a large combination punch, shears, and flanger, operated by an independent engine; a pipe and a bolt machine which turns out such articles in various sizes and lengths and with threads; there is a drill press, a shaper, and an eight-foot lathe, emery grinder, and a forge. There are four air drills, a pneumatic riveting and tripping hammer, and bilge, sanitary, and fire pumps all operating independently. Three enclosed arc lights may be placed at advantageous points on or above the wreck to aid the derrick operator. The entire ship is brilliantly lighted by electricity furnished by two generators. The captain's cabin, dining-room, and quarters for the crew are spacious and comfortable, and provided with all modern conveniences.

In the wrecking outfit for use in actual operations there are many appliances that seem strangely out of place to those unfamiliar with the salvage of ships. The giant air compressor with a capacity of five hundred cubic feet a minute, and independent condensers of smaller capacity placed fore and aft, can be operated separately or together. The Providence towing machine, of the largest size, and made especially for the *Favorite,* has eighteen hundred feet of towing cable, two inches in diameter, and was imported from England. It is placed forward of the coal bunkers and all openings, an advantage in wrecking operations. The three-drum hoisting engine will work in conjunction with the clam-shell bucket or the long boom, and has a capacity of twenty-five tons, the "grab" or bucket lifting three tons of ore, coal, or grain at one operation. There are twenty steel hutchocks to use with the jacks, and weighing six hundred and fifty pounds each; thirty one-hundred-ton jacks; ten sixty-ton jacks, all hydraulic; two air compressors of the portable kind to put on board the small boats or the wreck, and

each having a capacity of two hundred and fifty cubic feet a minute; another small compressor; five wrecking pumps; a sawing machine; six portable boilers; a twelve-inch suction pump; and a fourteen-inch rotary pump. The repair material carried consists of fifty thousand feet of lumber conveniently assorted as to size, a carload of steel plate, angles, and channels, and bolts, nuts, rivets, and small fittings as well as all tools needed by a machinist. A twenty horse-power motor boat, thirty-five feet long by five feet beam, rounds out the equipment. It is carried aft and handled by a boat crane which may also be used for lifting the pistons out of the engine cylinders, or handling machinery or material of any nature for the machine shop just beneath.

Of the methods employed in floating sunken vessels, the cofferdam principle, when the wreck is submerged not more than twenty-five feet, is, perhaps, most largely used, and is nearly always successful. It consists of building upon and around the vessel or a good portion of it, a water-tight wall of wood sheet-piling, strongly braced and calked at the joints to withstand any pressure of water. When the holes in the vessel's hull have been patched, the water is pumped out and the wreck rises to the surface. It may then be towed to a drydock for repairs. The compressed air method is sometimes used when the damage to the ship's bottom precludes patching from within the hull, — such damage as may happen from rasping and cracking of the plates on a reef or rocky shore. In this expedient, when the cargo, or as much of it as possible, has been removed, the hatches and other openings are securely sealed and the decks are strengthened by crossbeams. Compressed air is then forced into the hulk, the water within is gradually driven out through the rents in the bottom, and the force of gravity, which holds the mass on the reef or in the mud, is overcome by the buoyancy thus obtained by the confined air. On the cushion of air which supports it the vessel may be taken to the

nearest drydock for rebuilding and general overhauling. In some cases the damage to hulls is so great that structural weaknesses develop after floating, and with the most thorough temporary repairs, it is necessary to moor large schooners to the vessel's side by chains and cables, to keep her from foundering. It is then a slow and tedious towing in calm weather to the place where the overhauling is to be done.

When these methods fail to bring the wreck to the surface the salvors have still another, the pontoon system, which is of more modern application, and the lack of which in years gone caused many a good, though perhaps damaged, hulk to be abandoned as not salvable. With the pontoon, which has made the wrecking of ships an exact science, the salvor is certain of ultimate success. A pontoon is nothing but a big air-tight scow, sixty feet long, twelve feet wide and deep, having a well eight or ten inches in diameter, in its centre, and extending through the bottom. Through this well a heavy chain or cable is drawn, passed under the hulk, and secured in the same way to another pontoon on the other side. By means of a valve, water is admitted to the pontoons, which may be as many as eight or ten in number, they settle to the bottom, and the chains or cables are drawn taut. When the water has been pumped out of the pontoons, the tremendous lifting power of the submerged air chambers causes them to rise, bringing the vessel with them. Sometimes it is necessary to use the lifting cranes to keep the hull in an upright position while rising to the surface; and when it is up there is much work to be done, and constant vigilance on the part of the wreckers is demanded. The buoyancy of the submerged hull may be utilized by pumping out the water in the boilers and tanks, permitting air to enter in its place. Huge air-bags, made of rubber, placed in the hold and inflated by force pumps, displace a volume of water equal to their cubical contents and provide great lifting power.

Vessels which are stranded high on a sandy shore often present wrecking problems of a most perplexing nature; and, aside from the usual method of employing a number of tugs to pull on stout hawsers attached to the endangered vessel, dredging in a channel from the ship to deep water is sometimes necessary. These methods were successful in floating the five-thousand-ton freighters *H. W. Smith* and *Wm. Nottingham,* stranded high and dry on the beach at Buffalo, in the great gale of February, 1907. Three months' time was required for the operations, the channel though narrow was a long one, and there was much tugging and lifting needed to bring the vessels into their natural element. Ships driven on reefs or rocky shores of the lakes, especially Lake Superior, are seldom, if ever, saved, because they are soon battered to pieces, and long before the salvors can reach the scene there is nothing left from the fury of the elements to mark the place of the disaster. The Canadian steamer *Monarch,* on her last trip of 1906, was driven on the bleak and rocky shore of Isle Royal, in Lake Superior, and soon after broke in two, the aft section containing the machinery sinking in deep water, the other section being impaled on the rocks, to be broken up by the next gale which swept the stormy inland sea.

The Port Huron Wrecking Company, with wrecker *Charles Diefenbach,* has performed many successful salvage jobs along the lakes, the raising of the coal-laden steamer *Linden,* sunk on June 23, 1905, in St. Clair River, being one of the most difficult operations ever undertaken in those waters. It involved the use of pontoons and later of cofferdams and, as the wreck lay almost crossways of the channel, the swells from passing steamers were a menace and handicap to the work. After eleven hundred tons of coal had been removed from the hold, the vessel was gradually lifted by the pontoons and moved over nearer to the shore in shallow water, when, with the final efforts of the crew and with spouts

of water thrown out by the pumps of the wrecking steamers *Mary Groh* and *Myrtle M. Ross,* there resulted the floating of the steamer.

Captain Baker and his Detroit crew of wreckers are almost as well known on the coast for their victories over the elements of the ocean as on the lakes. In 1906 they raised the steamer *Oceanica* with a cargo of twenty-three hundred tons in eleven and one-half days. Two years later they recovered one thousand, two hundred and eighty-four tons of pig iron from the schooner *Kate Winslow,* sunk in eighty-four feet of water on the northern shore of Lake Superior. In 1901 the steamer *William Home* was lost during a gale in ninety-six feet of water in the northern part of Lake Michigan. After great dangers and hardships the eight hundred tons of pig iron were recovered by hoisting buckets, and landed on the docks at Manistique. The steamer *Wm. E. Reis* with nine thousand tons of iron ore, sunk in St. Clair River, in nearly sixty feet of water, was salvaged by this crew.

The Reid Wrecking Company, operating the steamer *James H. Reid,* and the Midland Tow and Wrecking Company, owning the wrecker *Reliance,* and Captain John Donnelly's crew of divers and wreckers, are also known from one end of the lakes to the other.

Of all the enlivening scenes along the lakes and particularly the water fronts of the large cities, none is more spectacular than the powerful fire boats rushing at full speed, with smoke belching and water foaming, to a conflagration. It may be an immense elevator or warehouse on the docks, or a manufacturing plant at some distance from the stream or harbor; but in either case the fire boats, one of which is equal in fire-fighting efficiency to six or eight of the best steam fire engines, are rated as valuable protectors for any city to possess. If at night, there is something impressively appalling in the raging of the fiery tongues, and the roar and snap and crackle, as the destructive element eats its ways through a lofty

structure containing millions of bushels of grain, or a big plant with its costly machinery or finished product. There are winding, jagged streaks of red reflected in lurid gleams on the water. The clouds of smoke, the hissing of water as it is thrown on the glowing structure, the crash of falling walls, and the last dying embers — the hot cinders — are a mockery of man's boasted control of the elements.

But more often the fire boats, which are always steamed up and ready for instant service, reach the scene of an incipient blaze before it has had time to spread into a spectacular conflagration, and it is drowned out in a few minutes by tons upon tons of water. These fires frequently occur in places almost or entirely inaccessible to the land side, and can hardly be reached by streams from fire engines, and were it not for the fire fighters on the water side, great loss of property would result. And the fire boats are efficient helps in fires in the business sections of the cities, sometimes at a distance from the water front.

All the largest cities on the lakes have special pipe lines laid through the commercial streets as far as a mile or more from the water front. These are provided with the usual type of fire plugs, and terminate at convenient points on the wharves along the water side. When a fire breaks out in this district the fire boats rush to the pipe-line terminals nearest the scene of the fire, connect up their hose, and pump away, forcing great volumes of water into the lines to supply a working pressure for the fire fighters. This is a performance seldom witnessed by the throngs of people attracted to a big fire, and there is no glamour about it. The boats are simply working, pounding, and pumping away to supply the much needed pressure to the water towers and hose lines at points where they can do the most good. It is only when a great fire occurs on the water front, drawing crowds of spectators, that the almost forgotten fire fighters on the water

are noticed, and, at such times, their performance is the wonder of all.

The city of Chicago, to protect its extensive lake front and miles of wharves along the Chicago River and branches, has seven fire boats, the largest and most powerful of which are the *Graeme Stewart* and the *Joseph Medill,* completed for service in 1909. In tonnage, pumping capacity, and an ingenious coupling up of electricity and steam for the perfect control of all movements, they are in advance of any similar vessels in American ports. All the operations of such a vessel about the river channels or in open harbor, including the fire pumps and other machinery, are controlled from the pilot house in the same manner as a motorman controls an electric car. Near the steering wheel, which operates the steam gear, is a controller by means of which the captain or pilot can start the steam turbines and by electric power send the boat ahead or astern, at low or high speed. This is a decided advantage in manœuvring in the narrow stream and crowded slips. The electric drive enables the fire boat to go closer to a fire and, when danger from falling walls is imminent, it can change position quickly and without turning about. The boats are one hundred and twenty feet in length with a beam of thirty-six feet and a draft of nine feet.

The power plant consists of two duplicate plants which are so arranged that they can be operated together or singly. Each unit comprises a steam turbine of six hundred and sixty horse-power, on the shaft of which are mounted a two hundred kilowatt generator and central-drive rotary pumps of four thousand, five hundred gallons' capacity per minute, and further on is a two hundred and fifty horse-power electric motor to drive one of the twin screws. The energy of the steam turbines is thus applied directly to the pumps or converted into electricity to propel the boat, the control permitting of quick reversing, stopping, or starting ahead, by a

like device to and with the ease of an electrically driven car.

The means by which these new fire-fighting machines are anchored solidly anywhere in the river, to avoid losing an advantageous position by floating about or being tied up to a dock, is as revolutionary and interesting as the power plant. There are three "spuds" or large, upright shafts, twenty-three feet long by eighteen inches in diameter, made of sheet steel and reinforced with angle-irons. Each one is operated by an independent steam engine connected by gears to a row of spur-teeth running along the spud, in the same way as dredges are securely held to the bottom of a stream. One spud is placed at each side of the pilot house, while the third runs through the centre line of the boat near the stern. They may be lowered or raised instantly by the simple touch of a lever.

The fire-fighting battery consists of two great "water-guns," so mounted that they can be swung in any direction or at any angle. Their standards are placed on a platform just over the pumps, each nozzle with a two-inch opening, taking the entire volume of four thousand, five hundred gallons per minute. When necessity requires, the two rotary pumps may be connected up and the force of nine thousand gallons per minute concentrated through one nozzle with a three and one-half inch opening. The water under a velocity of nearly sixty feet per second is thrown fully five hundred feet, or more than three hundred and fifty feet upward in a mighty stream. In addition to this equipment there are sixteen lines of hose. Not all of these, however, are used at one time, since the more lines distributing a given volume of water pumped, the less pressure and effectiveness is obtained from each stream. The fire crews manning these boats are on duty every hour of the day, the sixteen men being divided into shifts or watches, so that at an instant's warning they and their boats are ready for any call.

The fire-boat service of the largest cities on the lakes is composed of the following steamers:

Chicago	*Graeme Stewart*	120	ft.	length,	36	ft.	beam,	built in	1909	
	Joseph Medill	120	"	"	36	"	"	"	1909	
	Illinois	107	"	"	24	"	"	"	1898	
	Yosemite	98	"	"	23	"	"	"	1890	
	Swenie Dennis, Jr.	43	"	"	10	"	"	"	1886	
	Chicago	81	"	"	18	"	"	"	1882–1901	
	Fire Queen	63	"	"	16	"	"	"	1893	
Buffalo	*W. S. Gratton*	106	"	"	24	"	"	"	1900	
	John M. Hutchinson		"	"		"	"	"	1893	
	George R. Potter		"	"		"	"	"	1887	
Cleveland	*Essen*	158	"	"	31	"	"	"	1892	
	(Operated by Pickands, Mather & Company)									
Detroit	*James Battle*	116	ft.	length,	25	ft.	beam,	built in	1900	
	James R. Elliott	110	"	"	25	"	"	"	1902	
Milwaukee	*Steamer No. 15*	106	"	"	32	"	"	"	1903	
	Steamer No. 17	100	"	"	24	"	"	"	1893	
	Steamer No. 23	100	"	"	24	"	"	"	1896	

In addition to these splendid fire fighters with their picked crews, every important port on the lakes has one or more of its harbor tugs equipped with fire pumps and lines of hose to protect and, in a large measure, save its valuable property along the water front.

The navy on the Great Lakes is limited to the training ships of the naval militia of several of the lake States, which is composed of brigades in Michigan, Wisconsin, Illinois, Ohio, and New York. By the terms of the Rush-Bagot Treaty of 1817 with England, neither nation can maintain more than one armed vessel on the lakes or connecting waterways. The treaty is still in force, but this provision has been given a liberal interpretation, as it hangs on a very slender thread in this age of progress, in the granting of permission by the London Foreign Office for the passage of a number of United States gunboats of the obsolete class through the Canadian canals to the lakes. In every case these vessels have passed through

entirely unarmed and with the avowed purpose of use as training ships. Upon arriving at Buffalo they have again been armed with modern guns and equipment for the thorough training of the naval reserves, and have been given over to the military organization of the several States.

The object and scope of the naval militia, of the functions of which but few people have other than a hazy idea, are to furnish the navy in time of war with well-drilled and seasoned crews, trained in navigation, engineering, gunnery, and signalling, and familiar with and subject to discipline and ship routine. This of itself is a liberal education, the value of which was demonstrated in a practical way by the performance of the cruiser *Yosemite* in the Spanish War, which was manned throughout by the Michigan Naval Reserve. The organization has the same relation to the navy that the State militia has to the regular army, but it is of even greater importance, since it is impossible to recruit trained bluejackets from the ordinary pursuits of life in time of need, and there is no time to break in raw landsmen, — exacting conditions of training which do not so intimately affect the infantry service. And then, the future wars of the world will undoubtedly be fought largely on the seas, and the navy, with its great fighting ships and the splendid *personnel* of the crews, will be the country's chief defence.

It was fitting the geographical position of Michigan, surrounded as it is on three sides by the waters of four of the great Inland Seas, that the Naval Reserve of the interior should have been founded on its shores. On February 28, 1894, a few enthusiastic yachtsmen of Detroit met and decided upon the formation of the Michigan Brigade. Among them was Truman H. Newberry, destined in after years to hold the highest office in the Navy Department, and who was an indefatigable worker in the upbuilding of the Reserves. The first division was soon recruited to eighty members, — professional and

business men with the inborn sense of duty of the patriot, who were eager to give of their time and their best endeavors to the furtherance of the movement. After the first few months spent in perfecting the organization, the division settled down to actual work, the first Summer's drills being confined to infantry tactics, knotting and splicing, and general instruction in ship routine. The commanding officer of the division was Gilbert Wilkes who had been trained at Annapolis and had seen service in the navy. On October 16 the division embarked on the United States gunboat *Michigan,* which was then cruising in the river, and spent four days in various drills, the handling of the guns, engines, and in navigation, on Lake St. Clair.

From this beginning the movement spread so that in December the second division was recruited at Saginaw, and the third division at Detroit, which swelled the brigade to nearly two hundred and fifty officers and enlisted men. In July, 1895, the three divisions mobilized at Mackinac Island in a week of painstaking drills subject to the strictest discipline and regulations of army and navy life. The old fort was the scene of renewed activity — the regular detachment of troops having been withdrawn a few years before — as it was the headquarters of the Reserves, the divisions going out to the *Michigan* every morning, as she lay at anchor in the harbor, for the ship drills in a cruise in Lake Michigan or Lake Huron. In 1896 the cruise was repeated in Lake Huron and Saginaw Bay, with headquarters at Pointe aux Barques; and the following year Mackinac Island was again the rendezvous. During the Winter regular drills were held in the armories, and instruction and practice given in all the minor duties of the sailorman. During the Spanish-American War the Michigan Reserves saw actual naval warfare on the cruiser *Yosemite* in blockade duty off the coast of Puerto Rico, being engaged in several bombardments of Spanish forts.

ENTERING THE LOCKS, SAULT STE. MARIE

Fast Express and Excursion Steamers on the Detroit waterfront

Of late years the naval militia has grown more rapidly and, in 1909, there were two battalions of six divisions comprising the Michigan Brigade, with an enrolment of nearly four hundred officers and enlisted men. The fourth division of the first battalion is located at Benton Harbor, on Lake Michigan, while the divisions of the second battalion are located at Hancock on Lake Superior, and Escanaba on Lake Michigan. The brigade is under the command of Captain F. D. Standish, who is one of the two charter members still in duty, and Chief Engineer Mortimer E. Cooley, of the University of Michigan. The training ships manned by the brigade are the *Don Juan de Austria,* of eleven hundred and thirty tons, stationed at Detroit, and the *Yantic,* in use by the second battalion and stationed at Hancock. The former is of historic interest, being one of the Spanish ships sunk by Admiral Dewey in the Battle of Manila Bay, which was subsequently raised by Captain Hobson, repaired, and brought to America. The *Yantic* is one of the old frigates of the Civil War times, having been launched at Philadelphia, on August 12, 1864, and is one hundred and eighty feet in length, thirty feet beam, and with brigantine rig.

The Ohio Naval Brigade, which is composed of divisions at Cleveland and Toledo, have as training ships — entirely manned by the Reserves — the *Hawk,* stationed at Cleveland, and the *Essex,* at Toledo. The Illinois Naval Brigade with divisions at Chicago, man the *Dorothea;* the Wisconsin Naval Brigade the gunboat *Nashville;* and the Minnesota Naval Brigade, the *Gopher,* stationed at Duluth. The ten vessels of the little fleet, including those stationed on Lake Ontario, assemble for the annual cruise in upper Lake Michigan or Lake Huron waters, in July or August, and the drills are conducted under the supervision of officers of the navy, acting as a sort of board of examiners, who criticise and report to the department the performance of the vari-

ous crews. The cruise extends over a period of ten days, and is intended to bring the work of the Reserves up to the government standard. There are fleet manœuvres and daily drills with the small boats, signalling practice, sub-calibre gun practice, scrubbing decks, cleaning bright work, and fire drills, and "abandon ship." The machinery and equipment are gone over and the general efficiency of the Reserves is vastly improved.

There is a three fold purpose of the reserve man in giving time and labor to the cruises. One is the patriotic side, fulfilling a sense of duty. Then there is the physical advantage of the outdoor life and practice in handling small arms, rapid-fire guns, and small boats, besides learning the duties of the "jackie," the engineer, or the navigator. There is also the fun of the thing, with the sightseeing offered, and anyway, there is nothing so attractive to the healthy man as the fresh, clear waters of the lakes and a brief vacation cruise thereon.

In this progressive age the sailormen of the lakes are privileged characters. They are better paid, better fed, and more comfortably housed than any seamen in the world. In strong contrast are the old lumber carriers, their small and dingy forecastle, dark, dirty, and ill-ventilated, and the modern freighters arranged with the quarters of the crew above deck, affording plenty of air and light, and with the use of the bath whenever wanted. The sailormen never touch a hand to a bulk cargo, for the ship is loaded by the gravity plan and the cargo is discharged entirely by mechanical unloaders. Only when a portion of the mass of ore, coal, or grain shifts in a gale do the sailormen go below to shovel it back in place to bring the vessel to a level keel. Deckhands even in Summer earn as much as the second mates on the ocean, and watchmen often receive twice as much. They are paid twenty-five dollars and upward a month and feed, which costs not less than thirty-five cents a day; and thirty-seven dollars and a half after October first. The

wheelmen draw forty-five and sixty-five dollars a month and feed during the same time. Together with the engineers and firemen they are an independent and rather exacting class of workers, but, from the very nature of their duties and the dangers of the seafaring life, they are entitled to all privileges they enjoy.

By another important service does the United States Government, through the Postoffice Department, extend to the seamen and vessel owners alike, a valuable privilege and aid to free communication. It is the marine post office at Detroit — a branch of the local office — which delivers to and receives from, passing vessels in the river, all classes of mail matter. Although Detroit is a very busy port little of the through tonnage stops there. Time means money to the big freighters and they pass by the city at full speed, getting their mail and sending it out "on the fly." Coming down the lakes from the "Soo" or the Straits of Mackinac, a stretch of three hundred and fifty miles, takes from thirty-six to forty-eight hours, and at no time is the freighter in communication with land until the marine post office at Detroit performs the carrier service. It brings to the seamen news of home, the world at large, and marine circles, and to the captain the government weather reports, warnings of approaching storm, special instructions from the ship's owners, the stage of water at the Limekiln Crossing in the lower river, and maritime exchanges.

The little white steamer, with its officers and carriers clad in the gray uniforms of the service, is a unique and interesting feature of the busy river. During the fiscal year ending June 30, 1909, it handled in the eight and one-half months of navigation, five hundred and seventeen thousand and sixty-one pieces of mail matter, or an average of nearly two thousand, two hundred pieces every twenty-four hours, the service being maintained both night and day. On the balcony of the little station at the foot of First Street, a gray-clad figure may be seen at times

sweeping both stretches of the river with a field-glass, for sight of the steamers for which he has mail. When they appear around the bend of Belle Isle, or from the haze of the lower river, he hastens aboard the little white boat, a sharp blast of its whistle brings the carriers from within the station, the lines are cast off, and she steams out across the American channel to the lane of the big freighters near the Canadian shore. In the small clinker boat towing behind is the carrier making ready his packages for the vessels which the marine reporting service has given out as due. In the bow and stern are canvas-covered boxes for the proper arrangement of each package. Attached to the bow is a stout line about eighty feet long coiled ready for service.

As the big black hull of the freighter comes near, the line to the little steamer is cast off, and the carrier by his oars alone brings the bobbing craft up under the towering bow. The great wave of water borne onward by the huge mass of steel almost swamps the little cockle-shell, but it is skilfully handled and comes up alongside the freighter and close to it. The line is quickly thrown aloft and inboard; it falls on the vessel's deck, where many willing hands are awaiting it, and it is seized and made fast. In an instant the little boat is jerked clear of the water as the slack of the line is suddenly taken up, by the speeding vessel, but the carrier is ready for it and is hanging on. In a moment a bucket is lowered with the outgoing mail, the carrier empties it and places therein the ship's mail, including telegrams and special reports. "Haul away!" and "Let go!" are the shouted commands to the figures above. In a second the little boat is adrift to be taken in tow again by the little white steamer, which has raced along with the big fellow. The same service is often given to six or eight vessels in quick succession, passing one after the other in both directions, and so close together that fast work and keen judgment are exercised to accomplish it.

One long blast, one short blast, followed by another long blast is the signal meaning "We have letters for you," whether used by the oncoming vessel or the little white steamer. As there are more than four thousand vessels of American and Canadian register trading along the chain of Great Lakes, making more than one hundred passages a day through the Detroit River, it is scarcely to be wondered at that the marine post office is one of the busiest branches of the service. It is the only one of its specific duties in the world. The combined crews of the lake marine would go a long way toward making a large city, and, when it is considered that the population of the six largest cities on the lakes exceeds four million, the value of this service is clearly evident. It is, after all, another illustration of the wonders and far-reaching benefits of our wide-awake postal system.

CHAPTER XXV

ECONOMICS OF LAKE NAVIGATION

Relation of Lakes to the Prosperity of America — Volume and Importance of Lake Commerce of To-day — Rates, how Governed — The Great Fleets — Dangers of Early and Late Navigation — Profits — Value of Lake Shipments — Influence of St. Mary's River Canal on Expanded Lake Commerce — Its Traffic — The Government Works of Improvement in Eighty-five Years — Important Factor in Continued Prosperity of Lake Shipping and Saving to Millions of People.

WHAT the Great Lakes have done and are doing for America is momentous. Few people realize the important part the great Inland Seas play in the commercial life of the nation, or the development and progress that is told by the enormous growth of the waterway traffic since the eighties. They are the greatest factor in the continued forcing of the Northwestern frontier toward the furthermost limits of the continent; they have made the eight States bordering on their shores the very heart of the nation; and they exert a powerful influence in fixing the price of bread to populous Europe. The saving in water transportation of wheat in the long haul from the "granary of the empire" to the seaboard is sufficient of itself to reduce in a marked degree the price of bread stuffs.

By the very cheapness of transportation afforded by more than two thousand, three hundred miles of inland waterways, the prosperity of the whole American people is advanced and their happiness and contentment enhanced. From Louisiana to New Brunswick and from the far northwest of Canada to the South Atlantic sea-

board, this cheapness of transportation afforded by the inland waterways has an influence in fixing the ultimate price of staple food products and of numerous commodities of every-day use, to the consumer, is coming to be recognized, and the value of the lakes transportation routes more thoroughly appreciated. Furthermore, travel on the lakes highway is far safer, and is attended with less hazard of life than is any other means of transportation in America to-day.

During the last twenty years the navigation of the Great Lakes has saved to the people of America the enormous sum of one billion dollars. As stupendous as this may seem, the actual saving in the year 1909 was very nearly one hundred millions, which was considerably greater than any previous year. The commerce of the lakes is increasing by great strides, and with the building of many more six-hundred-foot ore ships, giant package freighters, and speedy passenger craft, the sum total of tonnage and the freights will, in another decade, reach figures never dreamed of by the early mariners. The saving as stated is represented by the difference between the rates for carrying about eighty-five million tons of vessel cargoes yearly by the water highways, and the freight which would be collected by the railroads for hauling the same commodities overland between the various ports, did the lakes not exist.

The bulk of the tonnage on the lakes, about ninety per cent of it, consists of iron ore, coal, grain, and flour, and lumber which includes other products of the forest. Of these the ore trade is the mainspring of the lake carrying traffic. It originates on Lake Superior and the northern portion of Lake Michigan, and moves east and south to the ports of Lake Erie, and to South Chicago and Gary, on Lake Michigan; and forms in the aggregate about one-half of the total tonnage. Of this great mountain of metallic rock, containing in a single year forty-two million tons, the United States Steel Corporation used

about twenty-five million tons or more than three-fifths of the total output. The greater portion of this was brought from the Superior ports in the ships of the corporation, the Pittsburg Steamship Company fleet, which numbers more than a hundred steamers and barges, including some of the largest ore carriers and bulk cargo ships in the world. Many of the independent steel companies also own their ore-carrying fleets, but all of them depend more or less upon the "tramp freighters" engaged in this trade to clean up their ore stocks at the northern docks, in order to provide an ample reserve at the furnaces for the Winter's run.

The coal trade ranks second in tonnage on the lakes and reached in the same year the enormous sum total of twenty-one million, five hundred and twenty-five thousand tons. Of this amount four million, one hundred thousand tons were anthracite, the greater portion of which was shipped to Lake Superior ports for distribution throughout the Northwest. As the coal traffic is largely westbound it forms a convenient return cargo for the independent ore and grain ships, and the rates at which these bulk cargoes are carried are far removed from any railroad competition. The shipments of bituminous coal, which aggregated seventeen million, four hundred and twenty-five thousand tons, were widely scattered among the lake ports, the product being chiefly used for industrial purposes. Two million tons of this was used by the steamers and tugs of the lake marine during the navigation season.

Of the other bulk cargoes, grain forms the third important commodity, and with the shipments of flour, furnishes the great fleet of smaller vessels, such as the wooden steamers in the three hundred to three hundred and fifty foot class, with profitable business throughout the season of navigation. For it is through the water highways of the Great Lakes that a large portion of the grain of the world is carried, the shipments from United States ports alone aggregating four million tons or nearly one hundred

and sixty million bushels. Of this tonnage wheat forms about forty per cent, corn about twenty-five per cent, oats about twelve per cent, with barley, rye, and flaxseed making up the remainder. It is all eastbound traffic originating at Chicago, Milwaukee, and Duluth-Superior, and destined for the ports of Buffalo and Erie. From the former point it reaches the seaboard for export or for consumption by the populous cities of the Atlantic Coast, very largely by way of the Erie Canal to New York, or, by way of the Welland Canal and the St. Lawrence River, to Montreal. The shipments of flour, which are chiefly from the head of Lake Superior to Lake Erie ports, aggregate one million, three hundred thousand tons, which is equivalent to thirteen million barrels.

The grain of the Canadian Northwest, the bulk of which is carried in ships flying the British flag, amounted to sixty-eight million bushels of which fifty-three million bushels were wheat. Port Arthur and Fort William, the Canadian ports of Lake Superior, are the twin grain-spouts of the British Northwest, from whence a large portion of the stocks is hurried to the seaboard for export, between the middle of September and the closing of navigation in December. The larger grain ships make the ports of Georgian Bay as a transfer point, but the others of three thousand tons' burden or less and carrying about one hundred thousand bushels, cover the entire route to Montreal by the Welland and the St. Lawrence canals.

The lake traffic in lumber and the allied products of the forest is still of sufficient volume to keep a large fleet of wooden steam barges and their tows busy from the opening of navigation to the closing of the northern ports by ice, early in December. The lumber districts which now supply a part of the demand of the Middle West and the Eastern States, are on Georgian Bay in Ontario and along the northern counties of Michigan on Lake Superior and Lake Michigan. At the principal shipping ports of Duluth and Ashland, the old-time barges may be

seen taking on deck cargoes of pine or hardwood lumber, shingles, or lath. Clearing from port they steam and sail down Lake Superior, through the canal and locks at the St. Mary's River rapids, and south through Lake Michigan to Chicago and South Chicago. This is the lumber distributing point for the western market of a large proportion of the forest products of the Great Lakes region, although the port of Tonawanda, on the Niagara River, receives and distributes much lumber for the eastern market, and the western coast of Michigan, the Saginaw Valley and Detroit distributing yards are still factors in this trade. The water-borne portion of this business amounted in the same year to one billion, three hundred and eighty million feet or two million, seven hundred and sixty thousand tons. The stocks are generally replenished from the Lake Superior mills, or by the imports from the Georgian Bay district of Canada. Many of the larger lumber companies own and operate barges for their exclusive use, so that they can control the tonnage and reduce the transportation costs, an item of much importance.

Other bulk shipments of some volume and importance are: salt, six hundred and twenty thousand tons; copper, one hundred and thirty-five thousand tons; and stone, cement, and sand for building purposes, amounting to a million tons or more. There is left the unclassed tonnage, including what is known as package freight, and this amounted to six million, six hundred and fifty thousand tons. It was carried for the most part in the large and fast freighters built expressly for this traffic, and which are owned and operated by the great railway systems. Buffalo, Chicago, Milwaukee, and Duluth-Superior are the principal shipping and receiving ports for miscellaneous merchandise.

The total domestic receipts by the fresh-water routes in 1907 exceeded eighty-three million tons, of which fully seventy-one per cent was credited to twelve ports. The largest tonnage received, nearly eleven million tons, was

at Buffalo, closely followed by Chicago, Cleveland, and Duluth-Superior. The shipments during this time appear to be less concentrated, the twelve ports in question shipping only fifty-seven per cent of the total tonnage. Because of the large ore shipments Duluth is far in the lead of the domestic lake shipment with sixteen million, seven hundred and fifty thousand tons, and Superior was credited with nine million, six hundred thousand tons. The vessel movement during the year is interesting as showing total departures of seventy-three thousand, seven hundred and sixty-nine, of ninety-nine million, one hundred and sixty-six thousand, four hundred and nine net tons. The effect of building much larger freighters for both the ore and package freight trade is shown effectively in the average size of all vessels plying on the lakes, for in that year it was one thousand, two hundred and seventy-one, as compared with one thousand, one hundred tons in 1905, and nine hundred and twenty-five tons in 1902.

According to Andrew Carnegie the northern portion of Ohio is the natural industrial centre of the world for the iron and steel industries, for, at no other spot can the iron ore, and coal which is necessary for its reduction, be assembled so cheaply as on the southern shores of Lake Erie. The earth is tapped a thousand miles away in the north country, the brown metallic substance is hauled to the ore docks by the iron trail, the leviathans of the lake marine transport it to the furnaces which, meanwhile, have been charged with another resource of the earth, and genii-like enginery, with man's hand at the throttle, turns out the finished product. This may be the reason why the various tonnage of Cleveland, with its manifold industries, has exceeded that of Liverpool; and the Cleveland district is, with the single exception of the Clyde, the largest shipbuilding point in the world. At no place in England or America can vessels be constructed so cheaply as in the great shipyards at Lorain and Cleveland.

The freight rates governing the Great Lakes traffic

are a variable element influencing the entire commerce of the nation; and may be said to be determined solely by the law of supply and demand. For, when the quantity of a given commodity to be transported greatly exceeds the active tonnage in sight to carry it, the rate naturally goes above the normal, if even for one day; while, on the other hand, should a number of vessels be seeking the same cargo, the rate at which it is carried must be depressed. The increase in vessel capacity and the consequent decrease in operating costs, and the reduced charges and saving in time of discharging and loading cargoes, have had very much to do with the decline in lake freights, especially within the last ten years. Within this period the ore rate has fluctuated from one dollar and twenty-five cents per ton, from Duluth to Lake Erie ports, to fifty cents per ton, and despite the wide range no interests appear to have suffered severely.

In 1901 the United States Steel Corporation, by fixing the rate at which its ore was brought down to the furnaces, namely, eighty cents per ton of two thousand, two hundred and forty pounds, established the rate at which all other carriers performed the same service. It was a very favorable rate at the time and, as there was a large production at the mines, many vessel owners engaged in other trade hastened to secure ore contracts at the prevailing figure. Of this the vessel owner paid nineteen cents dockage and unloading charges at the lower lake ports.

The effect of this quite general rush into the ore trade, because of the apparent increase in the profits to be derived from it, was all very well for the steel interests, but the equilibrium of the lake shipping was disturbed, and to re-establish normal conditions the shippers of other lines had to raise the rates quite generally. There were more ships, too, carrying ore than the ore docks at either end of the route could accommodate without more or less delay, and from this loss of time the carrying

STEEL SHIP *MAJOR*

MAUCH CHUNK, LARGEST PACKAGE FREIGHTER ON GREAT LAKES

THE *DANIEL J. MORRELL* FIVE MINUTES BEFORE LAUNCH

THE *JUNIATA*

capacity of all the vessels so engaged was reduced at least twenty per cent. From this condition of uncertainty there has been evolved within the last few years an almost perfect balance of trade, which is of great benefit to the shipping interests.

Through the interdependence of rates, which is carefully studied by the Lake Carriers' Association, and the application of the principles arising therefrom, the possibility of all vessels or even a considerable number going over from one trade to another, following an advance of rate in any, is very remote. Although it is natural that the higher rate in one trade should entice some vessels to it which previously traded in others, it is quite generally recognized that the balance of tonnage and shipments should be maintained, and the shippers, of grain and coal especially, are under the necessity of increasing the rates on those commodities, or deprive themselves of the vessels needed for the movement of their material. Of the two alternatives the former is now generally conceded to be the one calculated more easily to restore the equilibrium of stable and reasonable rates which for all interests should be maintained. The established rate on ore is now the basis on which all other rates are determined; and from simple and convenient tables the ratio of one bulk cargo to that of ore may be quickly found. So fine, indeed, has the transportation problem become and the solution so thoroughly solved, that the giant ore carriers, with their carrying capacity of fifteen thousand net tons, and equipped with economical engines capable of greater speed, can carry ore on the long hauls at sixty cents or even fifty cents per ton and earn as much net as the old craft earned at double the rate. The loading and discharging of cargoes is so expedited by present-day mechanical means, and all other processes so perfected, that it is now possible to mine ore, transport it to the furnaces, smelt it and convert the pig iron into steel and have it on sale in Pittsburg, in ten days.

The Great Lakes fleet of itself is greater than the fleet of any foreign nation, excepting Great Britain and Germany; and that portion of it engaged in the passenger and tourist traffic effects many economies in travel and provides in addition the most delightful trips imaginable. From one end of the lakes to the other, there is the same clear, blue water of crystal purity, continually lapping the sandy shores of green fields or woodland, and the wonder cities of the lakes, with their varied industries and busy water fronts reflecting the scenes of intense commercial activity within, are marvellous things as viewed by easterner and foreigner alike. The average rate for passenger travel is about one and a quarter cents a mile, which, with the first-class accommodations of rooms and cuisine of the splendid steamers, is a great incentive to forsake the hot, dusty, railway trains, and enjoy the cool, bracing air of the lake and the entrancing scenery of the straits.

The largest class of lake steamers of both the steamship and day or excursion types, which are designed to accommodate great throngs of tourists and travellers by fresh water at rates of less than one cent per mile, — often as low as one-half cent, — are operated only during about ten to fifteen weeks of midsummer. During that time they are generally crowded to their full capacity, and are the most profitable vessels on any inland waters. The cost of running them is great, often being from five hundred to eight hundred dollars a day, and it has been known to exceed one thousand dollars. This is such a considerable item in the economy of management that when the travel drops off in early September they are taken off and laid up for the Winter.

This has led many and late tourists, who have not seen the lakes and waterways at the height of the busy season of July and August, to imagine that a great depression of lake commerce and passenger travel exists. For at their wharfs are laid up in winter trim the largest and swiftest

steamers that ply any inland waters of the globe. They are the greyhounds of a great fleet which has done more to bring into prominence the beautiful lake region and the vast resources of the Northwest, than any other empire builder. One single trip of lean patronage for these great vessels, either in early Summer or after the tide of tourist travel has ebbed, may result in such financial loss as several profitable trips in midsummer hardly offsets. It is by long experience in maritime affairs and full knowledge of operating costs and traffic conditions, that the first and last sailing dates of any steamer are determined.

The smaller steamers, which are continued in service until early Winter ice closes the northern harbors and renders navigation even in Lake Erie dangerous and unprofitable, are capable of taking all the passenger traffic and merchandise then offered for transit. And these are the first to appear in the early Spring to open up the still icy ports, and, as harbingers of another busy Summer, inaugurate a service as the traffic warrants. Among the lake freighters, however, trade conditions and the ice and weather have the most bearing upon the opening of navigation and the closing of it for them. The Lake Superior ports are ice-bound until well along in May, and the lower end of Lake Erie is often so choked with the ice floes which have come down from the upper lakes, that it is impossible to force a passage. Sometimes in April the largest and most powerful freighters are held for a week or more at Buffalo waiting for a favorable shift of wind, or breaking up of the ice fields. When they venture out to buck the mass of ice hummocks they more often become wedged in, and are blown about as the mass is driven by the fierce gales which sweep the lake. At times members of the crew walk ashore on the ice to summon the aid of tugs or other ice-crushing craft.

It is the early and late business, however, which is the

most profitable, and despite the fourfold risk of disaster in the terrific gales of Winter, and with marine insurance cancelled, there are not wanting a few adventurous vessel owners who will take the chance of rushing the last of the grain and coal shipments. The incentive is great since from the summer rate, which fluctuates between one and one-fourth and two cents per bushel from Chicago or Duluth to Buffalo, there is a jump to two and one-half to three cents or even higher, and the increased profit thus earned may be a good share of the net profits for the season. The coal rate from Lake Erie ports to the upper lakes during the Summer varies from twenty-five to fifty cents per ton, while in December it goes to seventy-five cents or even one dollar.

Under such conditions a six-hundred-foot bulk freighter coming down the lakes just before Christmas with a full cargo of four hundred thousand bushels of wheat, will collect a freight bill of about twelve thousand dollars. When once docked at one of the huge elevators in Buffalo Creek, the grain is discharged in perhaps twelve hours, and the steamer is moved to a coal dock for a return cargo. Within four hours thirteen thousand tons of coal have been chuted into her cavernous hold, and in less than twenty-four hours from the time of entering the harbor, she is again ploughing the waves of Lake Erie, bound for a western port. By the close of the year she will have arrived at Chicago or Milwaukee with the sum of thirteen thousand dollars added to her credit, or a total of almost twenty-five thousand dollars freights for the round trip, and earned in about ten days. Even at the increased water rates there have been saved to the people at least fifty cents a ton on the coal and about two cents a bushel on the wheat, or a total of almost fifteen thousand dollars for the two cargoes, over the freight which would have been exacted by the railroads for the same haulage.

The value of the lake shipments in a single year now

reaches a billion dollars, and cargoes of the fresh-water vessels often reach figures almost beyond belief. The copper shipments from Lake Superior represent the greatest value; and one of the twelve thousand ton ships, which cost five hundred thousand dollars, will carry a cargo of the metal valued, at an average price, of four million, five hundred thousand to five million, five hundred thousand dollars. A full cargo of wheat will be valued at five hundred thousand dollars, the same tonnage of coal from forty thousand dollars to seventy thousand dollars, and iron ore, which represents nearly half of the tonnage of the lakes, only about thirty thousand to forty thousand dollars. The shipments of package freight, — general merchandise, — when carried in the great liners to their full capacity of five thousand to six thousand tons, may easily reach values considerably beyond a million dollars. Silks and woollen fabrics and manufactured goods, teas, canned goods, fine furniture, and silverware are well calculated to swell the value of a ship's manifest.

One of the main factors in the development of the lake region is the St. Mary's River Canal, with its locks of enormous size and capacity. Its influence and effect upon the maritime growth is undoubted, since the discovery and utilization of the vast mineral wealth of the Lake Superior country was brought about directly by its means. The development of the iron mines furnished an ever increasing trade for the great steel steamships, and also the raw material for their construction, while the greater capacity and speed — with the consequent reduction in operating expenses of the new tonnage — lowered the freights, which in turn still further developed the iron industry. This has had very much to do with the reduction in the price of Bessemer steel within the last fifteen years, and has made possible its use in shipbuilding, in improved railroad equipment, and in the structural forms of tall city buildings.

The dependence of prices of steel upon the water route

and that in turn upon the St. Mary's River Canal is exemplified in the price of iron ore laid down in Cleveland. The price paid by the Steel Corporation to the Great Northern, in 1910, for the ore of fifty-nine per cent or better of iron contents, at the Superior docks, was one dollar and seventy-five cents, two mills per ton of two thousand, two hundred and forty pounds. At a lake freight of seventy cents per ton the red hematite ore of Bessemer quality costs about two dollars and forty-five cents in Cleveland, while the lowest railroad rate, based on a per ton-mile which would show a profit, from the mines to the Cleveland docks is about two dollars and thirty-nine cents per ton. It is thus evident that the economies effected through improved transportation from mine to ore docks, the quick loading into lake freighters of great size, and the transit of the lake route at a speed of ten to twelve miles an hour, together with a discharge of cargo at surprising rapidity, amounts to about two dollars per ton of ore. Through these economies the production of pig iron in the United States has trebled since 1896, and is now almost one-half of the world's outgo. And this has been done during the decline of the Pennsylvania mines and the transfer of the manufacture of pig iron and steel from the east to the west of the Alleghenies.

The grain and flour traffic through the "Soo" canal, although of far less tonnage, is of equal importance, in point of value and its effect upon the prosperity of millions of people, to that of iron ore. The influence of the canal in developing wheat production in the country west of Lake Superior is due to the direct route it affords to the seaboard by either the Erie Canal to New York, or the Welland and the St. Lawrence to Montreal. The western wheat and flour is thus able to compete with that from the country near the eastern markets, which would not be the case if all-rail rates had to be paid. And this fact has lead to the building and extension of railroads in Dakota and

Minnesota, to tap other wheat-growing lands with a consequent increase of production.

In the lumber traffic of the lakes the canal is an important link in the chain of waterways, and will always continue to float a large portion of the consumption of the eastern markets and that of Chicago. There is yet more timber in sight about the lakes than is generally supposed, although mostly of hemlock and hardwoods. Great quantities of such lumber will be cut in the region of Lake Superior, and notwithstanding the alarm of the conservationists, many million feet of forest products will be carried down the lakes for years to come. Long after the old-time barges with their tows have passed to marine graveyards in the shifting sands of the lakes' beds, big steel ships laden with lumber, lath, and shingles will lock through the St. Mary's Canal, destined for the populous cities of the eastern ports. For, when the last of the available timber has been cut from the lake country, the lumber of the Pacific Coast will come to the front, as it is even now appearing. It will be hauled overland by rail and turned over to the cheaper water routes at Duluth or Port Arthur, for transit down the lakes. A rate fluctuating from two dollars to two dollars and fifty cents per thousand feet, board measure, is low enough to secure practically all the through business.

The total tonnage of all classes of freight passing the St. Mary's Canals, in 1907, was fifty-eight million, two hundred and seventeen thousand, two hundred and fourteen, of which forty-five million, five hundred and forty-four thousand, three hundred and nineteen was credited to the American canal and locks, and twelve million, six hundred and seventy-two thousand, eight hundred and ninety-five to the Canadian canal. The total water-borne commerce of Canada in that year aggregated twenty million, five hundred and forty-three thousand, six hundred and thirty-nine tons — nearly double that of any previous year. This was due to a large increase in vessel ton-

nage because of active shipbuilding in Canada, which now promises well for the maritime growth of the Dominion.

What the United States Government has done to improve the water highways of the Great Lakes and encourage shipbuilding on a large scale, has kept pace with the demands of commerce; and Congress is not slow in voting appropriations when it is shown that the investments will accrue to the benefit and profit of the people. This is true even though the improvement recommended is of apparently local character, for it is held that a real advantage of trade to a portion of the lake country cannot fail of being a benefit to the nation at large. But this policy wastes none of the public funds as is evidenced by the fact that, while the total expenditure on the lakes above Niagara, since 1823, has amounted to a little less than one hundred million dollars, there is now a clear channel at normal stage of water, of twenty-one feet from the head of Lake Superior to the foot of Lake Erie, and the present plans provide for an increased depth to twenty-five feet within five years. These projects include the new locks at the St. Mary's River Canal now under construction, one thousand, three hundred and fifty feet long, eighty feet wide, with twenty-five feet depth of water on the mitre sills, and costing four million dollars. The new locks and two of the three locks now in use at the "Soo," one on each side of the international line, are, with the exception of the Panama Canal locks, the largest in the world. The total expenditure in the eight districts exceeds two million dollars annually of which more than one-half is laid out on the improvement of the Detroit River at the Limekiln Crossing (the "Hell-Gate of the West").

The great returns bestowed on the American people by the policy of the Government, in its expenditure for the improvement of river and harbor, needs no better illustration than the saving of one billion dollars on an invest-

ment of only one hundred millions. No government expenditure has ever been made that has yielded such dividends, and still greater returns are yet to be realized from the twenty-five-foot channels. The waterways are the lines of least resistance, and although Nature has not always provided deep channels through them, their economic possibilities are inestimable when all obstructions have been removed.

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